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FILE

RADMAN (LJUBICA). **La rouille du Prunier en Yougoslavie. Contribution à l'étude morphologique et biologique de Tranzschelia pruni-spinosae (Pers.) Diet.** [Plum rust in Yugoslavia. Contribution to the morphological and biological study of *T. pruni-spinosae*.]—*Rev. gén. Sci. pur. appl.*, **65**, 7–8, pp. 215–225, 9 fig., 1958.

The examination of 84 specimens of plum rust from fruit trees revealed that in addition to the ordinary ovoid or pyriform uredospores, echinulate towards the base, furnished with a thick apical 'cap', and having 3–5 subequatorial germ pores, an exceptional spherical form occurred, but only on material from Bosnia [**38**, p. 369] and Africa [map 223]; it had thin, finely spinose walls and few germ pores, from which tubes were not emitted. The uredospores of *T. pruni-spinosae* are closely similar to those of *Ravenelia* and *Pileolaria*. The aecidia are like those of *Puccinia*, with a particularly well-marked pseudoperidium. A detailed study of the teleutospores confirmed the established subdivision into the *typica* and *discolor* forms [**17**, p. 756].

On plum the uredosorus may attain a diam. of 800 μ, whereas on *Prunus divaricata* it does not exceed 150–200 μ. On plum the sori (of both formae) are punctiform and prominent, while on apricot they are angular, scattered, and circumscribed by the epidermis. On *P. divaricata* and plum the paraphyses are long-pedicellate, terminating in a spherical head in the former and in one with a depressed apex in the latter; on peach they are squat and claviform. The teleutosori are identical in shape with the uredosori but are black instead of reddish and have no paraphyses. 'Mixed' sori of a dark reddish colour contain paraphyses, uredo-, and teleutospores. In plum and *P. spinosa* both forms of the rust occur jointly in central and W. Europe and all along the Mediterranean basin, but in France only f. *discolor* has been recorded on these hosts; the latter is also the only form found on almond, apricot, and peach in these regions. In Yugoslavia *typica* is widespread and permanent; *discolor* has been detected only in 7 localities of Bosnia, including Ljubliana and Belgrade.

The only alternate hosts in Europe are considered to be *Anemone coronaria*, *A. blanda*, and *A. ranunculoides*; *A. nemorosa* is believed to be infected by *Ochropsora ariae* always and not by *T. pruni-spinosae*.

In rain water in Van Tieghem cells 70–80% of the uredospores collected in early autumn germinated at 14°–16° C. and 30–40% at 10°. Samples taken from a mass of leaves on the ground in Oct. 1957 were still viable 152 days later (germination 15–20%). On the other hand, only 3–4% of the teleutospores of f. *typica* and 1% of f. *discolor* germinated. The germ pores of the former are situated at a distance from the median septum and those of the latter close to it. The production of the basidium was preceded by that of a long, thick, cylindrical promycelium; the basidiospores (typically 4) are reniform and lateral. A period of up to 113 days may elapse before uredospores develop from infections by aecidiospores collected from *Anemone*.

The subject of control is very briefly discussed. Promising results have been obtained with dithane and zineb [**38**, p. 530], recently tested in Yugoslavia as substitutes for other chemicals, notably Cu compounds, of which plum foliage is intolerant.

THOMAS (H. E.) & NYLAND (G.). **Gumboil disease of Apricot.**—*Plant Dis. Reptr*, **43**, 1, pp. 106–108, 1 fig., 1959.

A previously undescribed condition, designated gumboil, was found in 5–7% of the

trees in some orchards of var. Royal in several Californian apricot districts. Discrete swellings occur in the bark of younger limbs and extremely rough, cracked bark on the trunk and older branches, with masses of brown gum in necrotic pockets under the swellings extending, on older trees, from the inner wood to the bark surface. Affected trees are stunted to about ½ normal size. Graft transmission tests were negative but the disease is perpetuated in buds from diseased trees. The nature of the disease is unknown but may be of genetic origin.

KARLE (H. P.) & NYLAND (G.). **Yellow bud mosaic virus in Almond.**—*Plant Dis. Reptr*, **43**, 5, pp. 520–521, 5 fig., 1959.

[Peach] yellow bud mosaic [**37**, p. 92] was found in 1958 affecting 89% of the almond trees in a Californian orchard, where in 1943 they had replaced peaches affected by the same disease. Symptoms were worst on var. Texas, and much more severe than previously reported for almond [**19**, p. 416], but were milder on Nonpareil and Ne Plus. Severe crown symptoms were accompanied by reduction in yield and wrinkling of the fruit.

DIENER (T. O.) & WEAVER (M. L.). **A caffeine additive to aid mechanical transmission of necrotic ring spot virus from fruit trees to Cucumber.**—*Phytopathology*, **49**, 5, pp. 321–322, 1959.

At the Irrigation Experiment Station, Prosser, Washington, 0·5% aqueous solution of caffeine used instead of 0·01 *M* phosphate buffer for suspending ground leaves of sweet and sour cherry infected by necrotic ringspot [peach ringspot] virus induced a higher rate of mechanical transmission to cucumber cotyledons [cf. **28**, p. 223], made transmission possible for longer in spring, increased the longevity of the virus *in vitro*, and enabled transmission from *Prunus tomentosa* to cucumber.

PARKER (K. G.), BRASE (K. D.), SCHMID (G.), BARKSDALE (T. H.), & ALLEN (W. R.). **Influence of ring spot virus on growth and yield of Sour Cherry.**—*Plant Dis. Reptr*, **43**, 3, pp. 380–384, 1959.

Measurements by Cornell University, Ithaca, and New York State Agricultural Experiment Station, Geneva, of Montmorency cherry trees propagated from buds infected by latent [peach] ring spot virus showed their growth to be up to 10% and their yield 20% less than that of healthy trees [cf. **35**, p. 304], though the effect on growth is variable; diseased older trees may make greater growth, possibly because of reduced bearing.

English Morello budded to Mahaleb in 1954, half being healthy buds and half carrying latent peach ring spot virus, was further inoculated (50% only) in 1955 by budding with recurrent peach ring spot virus. All the trees which were healthy when so inoculated developed recurrent peach ring spot symptoms, but some of the already infected ones showed variable symptoms in 1956 and none in 1958. Recurrent peach ring spot progressively reduced yield and growth of originally healthy trees, but did not affect either yield or growth of originally infected trees; the former outyielded the latter. Thus a mild virus strain can give some protection against another strain, but may itself be more damaging than is realised.

WILLIAMS (H. E.) & WAGNON (H. K.). **A quick test for Kwangan-systemic virus.**—*Plant Dis. Reptr*, **43**, 5, pp. 534–535, 1 fig., 1959.

This method, used at the California Dept of Agriculture, Sacramento, involved top working dormant Mazzard cherry seedlings in late winter with Kwangan scions and chip grafting the Mazzard stock from known [peach] ring spot infected sources, so that each chip graft was vertically aligned with a bud on the Kwangan scion above. Seedlings so treated on 26 Feb. and kept in plastic bags for 1 week at 33° F., then potted and placed outside, remained dormant. On 13 Mar. they were

moved to the greenhouse and by 9 Apr. the epinastic symptoms induced in Kwangan by certain latent viruses [**24**, p. 236] were evident.

LOTT (T. B.). **The identity of small bitter Cherry and western X little Cherry.**—*Canad. J. Pl. Sci.*, **39**, 2, pp. 183–186, 1959.

Four years after inoculating 48 peach seedlings and 15 chokecherry trees [*Prunus demissa*] at Summerland, British Columbia, with small bitter cherry [virus: **30**, p. 171] from 2 sweet cherry trees, 3 peach seedlings and 2 chokecherry trees developed symptoms of [peach] western X disease. The results support the conclusion that the virus causing small bitter cherry is western X little cherry [peach western X] virus [cf. **38**, p. 483] or a form of it.

CATION (D.) & FRIDAY (J.). **Cracking and rot control of Sweet Cherry.**—*Plant Dis. Reptr*, **43**, 3, pp. 394–395, 1959.

At Michigan Agricultural Experiment Sta., East Lansing, 12 fungicidal chemicals or combinations applied to Windsor sweet cherry were responsible for differences of 13–96% in the amount of cracked fruit: a combination of low soluble Cu, wettable S, and lime gave the least, while highly surfactant materials gave the most. Other differences were in fruit size, maturity, and control of rot (*Monilinia* [*Sclerotinia*], *Botrytis*, and *Rhizopus* spp.) The least brown rot (*M.* [*Sclerotinia*] *fructicola*) followed Cu-S-lime, ferbam-S-glyodin, actidione-glyodin, and S-glyodin. Actidione dwarfed the fruit and delayed maturity. The Cu spray reduced fruit size and gave an objectionable residue but was the most profitable for the processing market.

LOVISOLO (O.). **Sopra un deperimento del Ribes causato da 'Xanthochrous ribis'.** [On a die-back of *Ribes* caused by *X. ribis*.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 1, pp. 19–28, 2 fig., 1959. [English summary.]

This paper on *Fomes ribis* on red and white currant bushes in Italy has been noticed [**38**, p. 324].

KARLING (J. S.). **Synchytrium vaccinii.**—*Sydowia*, **12** (*1958*), 1–6, pp. 149–159, 10 fig., 1959.

S. vaccinii [**11**, p. 188], a short-cycled, compositely monogallic sp. which produces only resting spores, causes a red gall disease of the cranberry. On ericaceous hosts it stimulates the development of large, reddish-lavender, composite, chalice-like galls with a flared apical rosette of elongate cells. Spp. of Aceraceae, Rosaceae, Aquifoliaceae, and Primulaceae are susceptible to infection but unfavourable to normal development of the fungus. Resting-spore germination has not been observed in *S. vaccinii*, but it is placed tentatively in the subgenus *Pycnochytrium*.

KNIGHT (R. L.), KEEP (ELIZABETH), & BRIGGS (J. B.) **Genetics of resistance to Amphorophora rubi (Kalt.) in the Raspberry. I. The gene A, from Baumforth A.**—*J. Genet.*, **56**, 2, pp. 261–280, 2 pl., 1959.

An abstract of this paper has been noticed [**38**, p. 611].

MCGREW (J. R.) & SCOTT (D. H.). **Effect of two virus complexes on the responses of two Strawberry varieties.**—*Plant Dis. Reptr*, **43**, 3, pp. 385–389, 1959.

At the Crops Research Division, U.S. Dept Agric., Catskill and Blakemore strawberry plants free from all viruses except latent A [cf. **38**, p. 217] were graft-inoculated with either mottle virus [loc. cit.] or latent virus C [**36**, p. 39]+leaf curl virus [**38**, p. 218]. The effects and that of latent virus A alone are set out in detail; they differed on the 2 vars. In all cases a reduction in yield and plant vigour resulted; the mottle complex was more severe in Blakemore and the other in Catskill.

Janick (J.) & Williams (E. B.). **Resistance of Strawberry varieties and selections to leaf spot and scorch.**—*Plant Dis. Reptr*, **43**, 3, pp. 413–415, 1959.

At Purdue University Agricultural Experiment Station, Lafayette, Indiana, evaluations in 1958 of 3 strawberry plantings (1955, 1956, and 1957) of 41 vars. and selections for the incidence of leaf spot (*Mycosphaerella fragariae*) [**38**, p. 21] and leaf scorch (*Diplocarpon earlianum*) [**35**, p. 683] showed Aroma, British Sovereign, Catskill, Crimson Flash, Empire, Fairfax, and Midland to have the lowest incidence of infection when both diseases were considered.

Hastie (E. L.). **Spray will correct iron deficiency in Pineapples.**—*Qd agric. J.*, **85**, 4, pp. 263–265, 1 fig., 1959.

Iron deficiency of pineapples [cf. **28**, p. 130] affects the fruit by deepening the colour to orange-red and preventing a normal 'fill-out'. The deficiency is due to excess Mn [**25**, p. 127] in the soil and is particularly severe in the Mary Valley, at Yeppon, Coolabunia, Brookfield, and near Nambour. Control measures, previously given, are repeated.

Mathur (R. L.) & Singh (R. D.). **Torula stage of Hendersonula toruloidea Nattrass on twigs of Psidium guajava L.—a new record.**—*Curr. Sci.*, **28**, 3, pp. 124–125, 2 fig., 1959.

In an orchard near Kota, Rajasthan State, India, in 1957, guava branches suffered from die-back, drying, and defoliation, generally in association with *H. toruloidea* [cf. **38**, p. 597]. Pycnidia were not found in nature nor obtained in culture.

Pontis (R. E.), Feldman (J. M.), & Klingner (A.). **Downy mildew of Sunflower in Argentina.**—*Plant Dis. Reptr*, **43**, 3, p. 422, 1959.

The 1st record of *Plasmopara halstedii* [map 286] on sunflower [cf. **37**, p. 299] in Argentina is noted from the Universidad Nacional de Cuyo, Mendoza.

Thomas (C. A.). **Fusarium infection of Safflower roots on acid soil.**—*Plant Dis. Reptr*, **43**, 3, pp. 416–417, 1 fig., 1959.

In trials over the past 6 yr. at Beltsville, Maryland, root rot of safflower has been found to be associated with *F. oxysporum*, but it occurred, or could be reproduced artificially, only in soils with pH 4·3–5.

Kale (G. B.) & Prasad (N.). **Phytophthora blight of Sesamum.**—*Indian Phytopath.*, **10**, 1, pp. 38–47, 4 fig., 1957.

A destructive leaf, shoot, and pod disease of *S. orientale* in Gujarat, India, affected 66% of the 2 equally susceptible cultivated vars. Tal and Tali. The disease kills the plant. The fungus isolated, which failed to infect other hosts, was identified as *P. parasitica* [**30**, 433; **34**, 817]; on the basis of its highly specialized parasitism a new name, *P. parasitica* var. *sesamum* Prasad, is assigned to it.

McCubbin (E. N.) & Eddins (A. H.). **Potato variety tests at Hastings.**—*Proc. Fla hort. Soc.*, **71** (*1958*), pp. 15–20, 1959.

The results of annual varietal tests from 1951–58 at the Potato Investigations Laboratory, Hastings, Florida, showed that Sebago is very susceptible to corky ring spot [spraing: **26**, p. 76; **37**, p. 108 *et passim*] and physiological internal necrosis [cf. **29**, p. 376], to the latter of which Red Pontiac is highly resistant, though very susceptible to spraing. Merrimack, Pungo, and Plymouth are resistant to spraing. Red Warba is susceptible to late blight [*Phytophthora infestans*]; Kennebec and Cherokee are resistant, but susceptible to spraing. Seedling selection B351–44 is very susceptible to spraing.

Müller (H. J.), Unger (K.), Neitzel (K.), Raeuber (A.), Moericke (V.), & Seeman (J.). **Der Blattlausbefallsflug in Abhängigkeit von Flugpopulation und witterungsbedingter Agilität in Kartoffel-Abbau- und Hochzuchtlagen.** [The infestation flight of aphids as dependent on aerial population and weather-conditioned agility in Potato degeneration and 'seed'-growing areas.]—*Biol. Zbl.*, **78**, 2, pp. 341–383, 7 graphs, 1959. [Russian and English summaries. 46 ref.]

This is an exhaustive survey of studies from 1953–56, using yellow-dish catches (V. Moericke, *NachrBl. dtsch. PflSchDienst., Stuttg.* **3**, pp. 23–24, 1951), 2 dishes of 20 cm. diam. 5 m. apart on bare fallow ground [cf. **38**, p. 679], on the course and intensity of the infestation flights of *Myzus persicae* and *Aphis fabae* in the 'seed'-growing area of Gross-Lüsewitz, N. Mecklenburg, and at Quedlinburg and Bonn, where degeneration from virus diseases is rife [cf. **32**, p. 612; **33**, p. 551, *et passim*].

The beginning, length, and intensity of flight of the 2 spp. varied widely in the different years and in the 2 localities; thus, neither coherent uniform populations nor compensation by migrations could be postulated. Estimated by statistical methods, the potential population density of winged *A. fabae* is lower by $\frac{1}{3}$ and of *M. persicae* by $\frac{3}{4}$–$\frac{4}{5}$ in the 'seed' than in the degeneration areas. These disparities are attributed to climatic conditions affecting the total dynamics of population (reproduction rate, parasite attacks, and the like), with the scarcity of peach (winter host) at Gross-Lüsewitz as the most important factor in the lower numbers of *M. persicae*. Moreover, in the 'seed' area the hours propitious for infestation flights are only about $\frac{1}{2}$ those in the degeneration areas, so that at Gross-Lüsewitz roughly $\frac{1}{3}$ of the potential flying population did, in fact, perform the flight as against $\frac{2}{3}$ at Quedlinburg. Again, owing to weather-conditioned differences in agility within the absolutely favourable hours, the actual flight intensity of *M. persicae* was on an av. 50 times greater in the degeneration than in the 'seed' area. Another significant differential factor is the much earlier onset of infestation flights in the former regions, coinciding with a phase of high susceptibility to virus infection in potatoes; at Gross-Lüsewitz that stage has normally been outgrown by the time aphid activity begins.

These hypotheses were corroborated by (1) a comparison of the grades of degeneration in the Quedlinburg and Gross-Lüsewitz districts in the trial years; (2) the results of 'main and control' tests on the progenies of crops of 8 standard var.; and (3) a test in 1956 in both degeneration areas on Ackersegen maintained virtually free from aphids by regular spraying with wolfatox. This var. like all the others showed a difference in virus infestation of 1:10 between Gross-Lüsewitz and Quedlinburg (the experimental conditions at Bonn were not strictly comparable but the results were in general agreement with the foregoing).

Hansen (S. E.). **Undersøgelser over variation i tørstofindholdet i sunde og bladrullesygeinficerede Kartoffelknolde.** [Studies on variation in the dry matter content of healthy and leaf roll disease infected Potato tubers.]—*Tidsskr. Planteavl*, **62**, 5, pp. 901–913, 5 graphs, 1959. [English summary.]

The sp. gr. of individual tubers, which was correlated with dry wt., was used as a basis for the separation of healthy from those infected by leaf roll virus at the Studsgaard Experiment Station, Denmark, in tests from 1953–56. In var. Alpha the dry matter per cent. of infected tubers was reduced by the virus [cf. **36**, p. 52], but in Up-to-Date and Bintje the differences were inconsiderable, and this method of diagnosis is therefore regarded as inapplicable.

Ferreira (J. F. D.) & Borges (M. de L. V.). **Virus na célula vegetal. Observações ao microscópio electrónico. I. Virus Y da Batateira.** [Virus in plant cells.

Electron microscope observations. I. Potato virus Y.]—*Bol. Soc. broteriana*, **32**, Ser. 2A, pp. 329–332, 2 pl., 1958.

Potato virus Y particles [**36**, p. 53] in leaf cells of *Datura metel* have been demonstrated without shadowing at the Instituto de Histologia e Embriologia da Faculdade de Medecina, Lisbon.

Niegolewski (Z.). **Osiągnięcia w hodowli Ziemniaka w zakresie odporności na zarazę ziemniaczaną.** [Results of Potato breeding in relation to resistance to Potato disease.]—*Hod. Rośl. Aklim. Nasien.*, **2**, 6, pp. 647–658, 1958. [Russian and English summaries. 6 ref.]

The first part of the paper, based mainly on the literature, deals with the symptomatology of late blight (*Phytophthora infestans*), host-pathogen relationships, and the effect of environmental conditions on them. The problems of host resistance and the physiological specialization of the pathogen are discussed. The second part deals with potato breeding experiments carried out in Zamarte and Wyszobór, Poland [**37**, p. 302]. In addition to the usual artificial infection in the field and of cuttings, seed tuber infection has been successfully employed in varietal resistance determinations. Hybridization has produced several lines with leaf and tuber resistance. Of these, 2 have been introduced into cultivation: Epoka (R. 913 × Delfin), an edible mid-early var., and Wulkan (R. 913 × 860), a late var. with a high starch content in the tubers; both are resistant to *P. infestans*, potato virus Y, and potato leaf roll virus.

Guthrie (J. W.). **Fusarium eumartii wilt and tuber necrosis in Idaho.**—*Plant Dis. Reptr*, **43**, 3, p. 423, 1 fig., 1959.

F. solani var. *eumartii* [cf. **31**, p. 628], noticed in 1956 on Russet Burbank, was found in 1957–58 on more than 1,000 acres of commercial potatoes, causing losses of 5–100%, chiefly owing to subsequent stem-end tuber necrosis. No satisfactory soil fungicide was found in trials for control.

Crossan (D. F.). **Control of Potato seed-piece decay.**—*Plant Dis. Reptr*, **43**, 5, pp. 543–545, 1959.

At Delaware Agricultural Experiment Station, Newark, in 1956–58 treatment of seed pieces with captan 50 W dust or dip effectively checked decay by *Erwinia carotovora* [cf. **36**, p. 785] or *Fusarium solani* (suspensions atomized over the seed-pieces), both of which may occur when soils are cool and wet after planting. Captan combined with streptomycin was also effective in preserving seed pieces in storage for several weeks. In soils that were well-drained or warm and dry at planting stands were not improved by treatment provided the pieces were cut and planted on the same day.

Knutson (K.), Line (R. F.), & Eide (C. J.). **Varietal response to seed piece decay.**—*Plant Dis. Reptr*, **43**, 5, pp. 546–548, 1959.

Field tests by the Institute of Agriculture, University of Minnesota, St. Paul, in 1956 and 1958, in which seed pieces of 12 potato vars. were inoculated by power spraying with suspensions of *Erwinia atroseptica* [**38**, p. 245], *E. carotovora* [see above], and tuber-rotting *Fusarium* spp. [see above], showed that varietal differences in susceptibility were not consistent and were affected by variation in inoculum, differing weather conditions, and the condition of the tubers. Seed piece decay did however reduce yield/plant.

McClure (T. T.). **Rhizopus decay of Sweet Potatoes as affected by chilling, recuring, and hydrowarming after storage.**—*Phytopathology*, **49**, 6, pp. 359–361, 1959.

At the Plant Industry Station, Beltsville, in 1956 Nemagold sweet potatoes were cured for 10 days at 85° F. and stored at 55°, roots being removed for inoculation

with *Rhizopus* sp. (half-roots dipped in spore suspension) either at once or after further storage at 45° or 32° for 1–8 days. Inoculated roots were kept in baskets at 85°–55° for 1–8 days under humid conditions. Finally all roots were transferred to 65°, kept moist for 8 days, and the amount of decay noted. In 1957 var. Orange Jersey was submitted to similar treatment, but some roots were immersed for 15 min. in water at 110° (bringing them to 85°) before inoculation.

Decay was markedly less after recuring at 85° [cf. **35**, p. 323] than at 75°, 2 days at 85° being as effective as 4 or 8. Chilling for 1 day at 32° or 4 at 45° increased subsequent decay in roots recured at 65° or 75°, but not in those at 85°. Hydrowarming would seem an effective means of heating roots for recuring during transit.

Hilton (R. N.). **Maladies of Hevea in Malaya.**—101 pp., 41 col. pl., Rubber Research Institute, Kuala Lumpur, Malaya, 1959. $30 (Malayan); in countries contributing to the Malayan Rubber Fund, $20.

This publication, essentially to help planters to identify pathological conditions encountered by means of carefully prepared descriptions and illustrations, is in 2 parts. The first consists of an introduction dealing in general terms with the 6 aspects under which each disease is later treated: symptoms, cause, other plants affected, spread, prevention, and treatment. The second part illustrates and describes 41 diseases of rubber as they occur in Malaya, their names being given in English and Malay. The coloured plates, from watercolours by Hoh Choo Chuan, are of exceptional merit, and will be of great assistance in the recognition of the diseases.

Brown root rot of Hevea, Fomes noxius. Bark rot and canker of Hevea, Phytophthora palmivora. The Phytophthora leaf disease of Hevea.—*Adv. Circ. Rubb. Res. Inst. Ceylon* 63, 2 pp.; 64, 3 pp.; 65, 4 pp., 1958.

These circulars, superseding respectively *Circ.* 48 [**35**, p. 392], 54 [**36**, p. 58], and 45 [**35**, p. 324], deal briefly with the biology of the causal organism concerned, the recognition of the disease, and its control.

Reports on forest research for the years ended March, 1957 ; March, 1958.—vii+176 pp., 4 pl., 13 graphs, 1 chart; viii+191 pp., 4 pl., 1 fig., 10 graphs, London, H.M. Stationery Office, 1957, 1959.

In the 1st report G. D. Holmes & G. Buszewicz report (p. 19) that fungi identified during tree seed germination tests by Dr. S. Batko of the Pathology Section [cf. **35**, p. 643] included *Monochaetia* spp. on *Araucaria araucana* seed, *Melanospora zamiae* on *Abies* spp., and *Fomes annosus* on *Abies nobilis*.

In the forest pathology section (pp. 65–67) J. S. Murray states that further observations on the root disease causing group dying of conifers [cf. **36**, p. 793] confirmed that the causal agent is *Rhizina inflata* [**38**, 430], which becomes established on recent fire sites and attacks adjacent root systems. Typical symptoms, viz. dead roots, resin exudation from stems, and thinning of crowns, were noted on adjacent trees 18 months after a fire had been lit. The disease appears to be spreading, but is serious chiefly in W. and S. Scotland and the English Lake District. In one locality *Rhabdocline pseudotsugae* [cf. **36**, p. 797], usually only present on 1st year needles, fruited on 2-yr. needles of Douglas fir [*Pseudotsuga menziesii*]. Serious attacks by *Lophodermium pinastri* [cf. **36**, pp. 74, 797] on nursery and recently planted stock of Scots pine occurred in the autumn and winter of 1956. Dense stocking of the seed-bed with nursery conifers was demonstrated to encourage *Botrytis cinerea*.

Investigations at Bedford College, London, by Ida Levisohn (pp. 86–91) showed that birch and Norway spruce seedlings benefited from the introduction into the soil of *Boletus scaber* [cf. **36**, p. 794], though *Amanita muscaria* produced hardly any effect. Roots of 2-yr.-old birch seedlings planted in a pit of Wareham soil

inoculated with *B. scaber* were fully mycorrhizal, while those of Norway spruce were largely normally mycorrhizal with a small amount pseudomycorrhizal. In the pit inoculated with *A. muscaria* birch had a few mycorrhizal associations and Norway spruce traces with numerous pseudomycorrhiza.

The av. height of 60 1 yr. Scots pine seedlings in sand culture was 2·9 in. (root systems mycorrhizal) when inoculated with *B. bovinus* mycelium and 1·9 in. with *B. scaber* (non-mycorrhizal).

In water culture differences in the morphological structure of dichotomously branched short roots [loc. cit.] of actively growing pine seedlings depended on the nature of the substances introduced into the cultures. Of numerous soil fungi tested, none caused root branching.

In a mulching experiment at Wareham [cf. **32**, p. 108], in which Norway spruce was given different treatments, each series being inoculated with *A. muscaria* or not, the death-rates at the end (1956) were: no mulch, 84·7%; $\frac{1}{8}$ compost, no mulch, 38·9%; fully composted, no mulch, 21·7%; mulched with bracken, 13·9%; mulched and $\frac{1}{8}$ composted, 6·9%; and mulched and fully composted, 6·7%. The foliage of all the mulched plants was of a good colour. At the end no surviving tree had any trace of the pseudomycorrhizal association present when the trees were planted, though it was evident in unmulched plants up to 1954. In 1956 the very chlorotic trees among the unmulched had traces of mycorrhiza, while the less chlorotic had a fair number; all the mulched plants were fully mycorrhizal. All the mycorrhiza were apparently formed by *B. bovinus*; there was no indication that *A. muscaria* had produced any associations in the inoculated plots.

Lawson's cypress [*Chamaecyparis lawsoniana*] (originally from the Kennington nursery) with stunted growth and yellowish foliage, treated in June 1951 with heather mulch, showed from the next spring a marked improvement in colour and growth. Those given clean screefing also improved, but were far behind the mulched. Infections by *Mycelium radicis atrovirens* [cf. **33**, p. 494] were present in all unmulched plants, whether given K or not. The fungus formed large, crusty sclerotia within the outer cortical-cell layer of the roots, which blocked the cells. Infection was mainly seasonal, occurring only very occasionally during summer. Even by the end of 1951 the mulched plants had developed traces of endotrophic mycorrhiza; they were deeply mycorrhizal throughout the following years. Neither the controls nor the K-treated had (up to the time of writing) normal mycorrhiza. The screefed plants were slightly infected by *M. r. atrovirens*.

Pot-cultured 1-yr.-old *Pinus radiata* seedlings in sterilized and unsterilized soil, whether inoculated with *B. scaber* or not, and plunged in gravel pits on 6 Apr. 1956 were all dead by the beginning of May, though those completely covered with heather survived. Foliage colour of birch, Norway spruce, and Lawson's cypress was markedly improved. After 6 months all the mulched plants were greatly superior in height and colour to the unmulched. Trees from the 'mycorrhizal' soils showed no mycorrhizal reaction to the mulch cover. It may be assumed that the protection against low temperatures played an important part in the effect produced.

In studies at the University College of North Wales by C. G. Dobbs and Joan Bywater (pp. 92–94) on a means of assaying and comparing soils in respect of the inhibitor and of their ability to support mould growth, *Mucor ramannianus* was adopted as the chief test organism in place of *Penicillium frequentans* [**37**, p. 24]. Three levels of mycostasis can now be distinguished by the cellulose film test: (1) complete inhibition of germination on the 'closed' and on the 'open' film; (2) complete inhibition on the 'closed', but some germination on the 'open'; and (3) germination on both. Except for deep subsoils, category (3) is confined at present to 2 samples of dark forest humus collected, respectively, under pine and oak in Feb. 1957.

Preliminary work in 1955 showed that the mycelium of *Polystictus versicolor* in agar culture is affected by an inhibitory factor diffusing through cellulose film from fresh soil. More recently, the effect of the inhibitor on macerated mycelia of a range of basidiomycetes was studied; in general there was an inhibition or reduction of growth. The conidia of *Fomes annosus* and *Collybia velutipes* were prevented from germinating in the 'closed' fold.

Marine sands from Newborough Warren, Anglesey, appear to contain one chemical inhibitor which survives washing and autoclaving, and another removable by autoclaving. There are indications, including the germination of spores and the growth of moulds on the exposed surface of soils which inhibit the film tests, that a volatile inhibitor may be present.

J. Rishbeth (pp. 98–99) gives further information on large-scale creosoting to prevent surface infection of pine stumps by *F. annosus* [cf. **36**, p. 626]. Some forms of creosote appear to be more effective than others. Among the most promising chemicals tested for killing the surface tissues of stumps were polybor-chlorate (20% aqueous) and ammonium sulphamate (40%).

D. S. Meredith (pp. 99–100) describes studies on the ecology of fungi colonizing coniferous stumps in E. Anglia, with special reference to the nature and extent of competition between *F. annosus* and other fungi in stumps and to stump infection by spores [loc. cit.]. At monthly intervals in 1956, 2 widely separated compartments in Thetford Chase were thinned for the 1st time. Half the stumps were not treated, half were creosoted immediately after felling to exclude air-borne basidiospores. After 5 months it was found that the frequency of infection by *F. annosus* [**37**, p. 119] increased during and just after the spring drought, whereas the number of stumps infected by *Peniophora gigantea* decreased sharply. This decrease was correlated with the disappearance of sporophores, but some stumps were always infected; the creosoted proved conclusively that infection was not through the roots. Sporophores of *F. annosus* could always be found during drought. The wet summer of 1956 caused *P. gigantea* sporophores to appear early, and stumps produced after June had a high incidence of infection. Conversely, the number of stumps infected by *F. annosus* decreased, partly owing to rapid replacement by *P. gigantea*. The monthly thinning experiment showed that *P. gigantea* colonized a proportion of stumps even when sporophores were not present.

In further studies at the University of Nottingham [cf. **36**, pp. 624, 795] by R. G. Pawsey (pp. 100–102) no ascospores of *Keithia* [*Didymascella*] *thujina* were trapped on slides in a small vaned spore-trap in a *Thuja plicata* nursery even after heavy infection in May and June 1956. An automatic, volumetric spore trap, kept running continuously from 22 June–21 July when mature apothecia from the new infection were discharging, also detected no ascospores. Microtome examination indicated that penetration takes place directly through the unbroken epidermis and not through the stomata. In the laboratory at humidities approaching saturation mature apothecia discharged continuously. If the surface of the apothecium was dried rapidly during this phase, the rate of discharge was greatly increased, momentarily. If saturated conditions were then re-established, there was no discharge for a considerable time. Discharge was heaviest during and after rain, and much less marked during max. atmospheric humidity in the early morning. Discharge from apothecia removed from the plant was recorded to a height of 5 mm. above the surface of the apothecium.

P. Biggs (pp. 102–104) reduced the 8 strains of *Meria laricis* previously suggested [loc. cit.] to 4. These are separable by cultural characters, including smooth or fluffy mycelium, number of spores, and discoloration of medium. Growth occurs at 0–25° C., opt. 17–20°, and within a pH range 3·1–10, opt. between 5 and 7. Under any particular set of experimental conditions the various strains are separable by different growth rates. The number of isolates of strain 'a+' obtained

remained constant over a period of 2 yr. The spores can germinate over the range 0–25°, opt. about 17°. The germ-tube enters through the stoma. In inoculation experiments disease symptoms appeared most rapidly on European larch, followed by hybrid larch and then by Japanese larch [*Larix leptolepis*]. Inoculation with a particular strain in no instance gave the same strain on re-isolation. Strains 'a' and 'b' were isolated from all 3 species. Analysis of data indicated that primary infection occurs on European larch. There is no recorded case of *M. laricis* having been found on *L.* species other than European where European larch was [present but] not infected. In only one nursery (Danidstow, Wilsey Down Forest, Cornwall) was *M. laricis* present on the Japanese in the absence of European larch. In 1956 6 nurseries unaffected in 1955 reported attack, and in 5 of these infection was confined to European larch, though other species were also grown.

J. G. Manners reports from the University of Southampton (pp. 104–105) that *Trichoscyphella willkommii* [cf. **36**, p. 795; **37**, p. 320] appears to do most damage to larch when the cambium is dormant. In several inoculated trees the wounds healed during the following summer but the fungus killed a large area of cambium during the succeeding winter, and a canker resulted. The evidence indicated a correlation between susceptibility to frost and susceptibility to the fungus.

R. Faulkner (pp. 159–170) found that chloropicrin injected into conifer nursery seed-beds at a depth of 4 in. and a rate of 0·62–0·84 gal./100 sq. yd. (30–40 gal./acre) is usually a more effective soil sterilizer (gauged by the height of seedlings) than formalin (5–10 gal. of 35%, diluted in 150 gal. water/100 sq. yd.). Chloropicrin should be applied at least 30 days before sowing, but preferably during the previous autumn. It is more successful on light, sandy and medium-textured soils than on heavier.

In the forest pathology section of the 2nd report J. S. Murray refers to a hitherto unrecorded disease of pine in Great Britain: symptoms on the needles and the morphology of the fungus on diseased material from Wareham suggested that it was closely related to, but not identical with *Septoria* [*Scirrhia*] *acicola* [**20**, p. 186]. *Lophodermium pinastri* caused serious losses [of pine] in many nurseries in 1957; the severe needle cast it causes has become increasingly common on pines in the last few years.

Melampsora pinitorqua infection was established at Alice Holt on both pine (Scots and Maritime) and aspen (*Populus tremula*) by placing aspen leaves from an infected area in a mixed planting during the winter: no lesions occurred on Corsican pine, *Pinus resinosa*, or *P. radiata*. There was moderate spotting on *Populus tremula* × *P. tremuloides*, but none on *P. grandidentata* or *P. tremuloides*. Inoculations of the aspens with aecidiospores from the pines supported these results.

In spraying trials against *Botrytis* infection of nursery conifers control was given by a wide variety of fungicides, provided that they were applied before infection occurred: a formulation of thiram, at about 4 lb. active material/acre, gave the best results.

In the course of a survey of *F. annosus* on conifers over most of the country [cf. **38**, p. 283] it has become apparent that butt rot and death are important, and that windblow attributable to root rot is of increasing importance. There is clear evidence of the increase and spread of the fungus, and good reason to anticipate its entry into most conifer crops during the present rotation unless protection is given. The present scale and distribution of infection is largely attributable to past conifer history. The crucial factors are the presence of stumps and the availability of spores. During this survey many records of damage by *Polyporus schweinitzii* have been made: it causes severe and very rapid rot in the stems of many conifers, particularly Douglas fir. Decay by *Armillaria mellea* has also been increasingly noticed, being normally limited to the immediate base of the tree. It is important mainly in offering ingress to other root rot fungi, and in the occurrence of windblow

associated with extensive root rot. It is found mainly in spruce and on old hardwood sites.

Ida Levisohn (pp. 90–98) attributes the adverse effects (noted in the preceding year) on growth and vigour and resultant early maturation of birch saplings grown in soil from Yorkshire inoculated with *Boletus scaber* [**36**, p. 799] to (*a*) an antagonistic root fungus resembling *Mycelium radicis atrovirens* [**35**, p. 839] and the fact that (*b*) there appear to be two distinct forms of *B. scaber*, one of which has adverse effects and stimulates *M. r. atrovirens*, and (*c*) under some conditions *B. scaber* is slow in establishing mycorrhiza, leaving the root vulnerable to attacks by other fungi.

Trypton and tryptophane media have proved useful for classifying sterile fungi from rhizospheres and soils.

C. G. Dobbs & Joan Bywater (pp. 98–104) tested the inhibitory properties of soils (sampled at several levels) by spore germination of *Mucor ramannianus* on cellulose films covering the moistened soil in 25 ml. cylindrical 'oxoid' caps, incubated at 27° for 48 hr. in a moist container; percentage germination was compared with that on the cellulose margin not in contact with the soil. There was some seasonal variation with all 4 forest soils, and it was marked in most of them. In each, inhibition was complete from July–Sept. 1957, but decreased during the winter, reaching a min. in Dec. and Jan. 1958, after which, as in the spring of 1957, it increased again. It was noticeable that all the soils which stimulated growth and sporing during the winter were from a locality of low altitude.

When about 40 samples from England and Wales were tested in this way, addition of glucose stimulated germination in most, but not all.

R. G. Pawsey (pp. 109–111) found that inoculations with *Didymascella thujina* under open laboratory conditions gave an incubation period in *Thuja* of 4–9 weeks, while in a constant temp. room at 20° it was 2–3 weeks, and at 13° 6–7. Inoculation was best done by attaching sprays of heavily infected *Thuja* foliage, on which large numbers of discharging apothecia were present, to the branches of potted plants. At 5° no infection was secured after incubation for 5 months. When inoculated 2 yr. plants were kept at 20° until apothecia were beginning to develop, batches then being transferred to 13° and 5°, those kept at 20° were found to be actively discharging ascospores after a further 4 weeks; at 13° apothecial development had continued, but the leaf epidermis was still intact; at 5° there was no further development. It appears that ascospores on the leaf surface may remain viable for at least 5 months. Brushing inoculated plants with a stencil brush held in the chuck of an electric drill removed only some of the spores from the surface of inoculated leaves. Ascospores on the surface of young *Thuja* plants appear to constitute an important source of infection under natural conditions in nurseries in spring. There was strong evidence that direct cuticular penetration occurs. Initially, colonization of the mesophyll is intercellular; haustoria, commonly bifurcated and stirrup-shaped, develop in the mesophyll cells. After external symptoms appear the mesophyll is disrupted with the formation of a loose mycelial matrix. Apothecial development follows.

Further work was carried out by J. G. Manners (pp. 111–112) on European larch trees which in 1953 were inoculated with *Trichoscyphella willkommii* and exposed to local freezing; the resultant cankers became dormant when the trees were subsequently maintained in frost-proof cold frames; and when they were frozen in a refrigerator in May 1957 the cankers were reactivated and increased in size. This indicates that recurrent frosts will cause these cankers to persist in an active state. In another experiment, initiated in May 1956, 6 trees of Polish origin and 6 of Scottish were either frozen only or frozen (dry or wet) and treated with a spore suspension: in May 1958 the Scottish trees appeared the more susceptible. Frost damage, in the absence of the fungus, was always healed within 2 yr., but

when the frost-affected area was sprayed with a spore suspension immediately after freezing the number of damaged trees was greater, especially the Scottish.

P. Biggs (pp. 112–113) reports that in shake cultures 2% sucrose gave better growth of *Meria laricis* than either glucose or fructose at the same conc.; sucrose at 5–20% was even better. The growth of all strains is enhanced by adding a sterile extract from the needles of either European or Japanese larch to a basal medium consisting of mineral salts and sugars, needles of the former sp. giving better growth. Spores germinated over a wide range of temp., but only a small range of R.H. (i.e. at 100, 99, or 98%, but not at 90% or below). Development of the mycelium and spore formation were retarded at 100%; mycelial growth was greatest at 99, and spore numbers at 98%. From charted data on the time of attack in Forestry Commission nurseries and from official meteorological records it is apparent that infection is dependent upon a specific relationship between temp. and humidity: 90% humidity for at least 24 hr. or over 70% for 4–5 consecutive days is necessary. The time lag between the occurrence of the specific conditions of humidity and the first noticeable appearance of the disease depends on the prevailing temp; if this is below 10° C. then the lag is 3–4 weeks: if it is above 10° for 12 hr./day the lag is 2–3 weeks: if it is above 10° [at all times] the lag is 10–14 days.

Levisohn (Ida). **Strain differentiation in a root-infecting fungus.**—*Nature, Lond.*, **183**, 4667, pp. 1065–1066, 1959.

In further tests at Bedford College, London [cf. above], with 7 isolates of *Boletus scaber*, isolates 1 and 2, which in some respects behaved similarly and grew well on a wide range of litters, gave a negative reaction for phenoloxidase in the guaiac and Bavendamm tests. However, in contrast to isolate 2, isolate 1 discoloured 'D.T.A.' medium (as a result of a change in pH) and changed the colour of a tryptophane medium to pink-cherry red (apparently because of a metabolite derived from tryptophane). These results are in agreement with a strain differentiation which had been expressed in unequal effects on growth of tree seedlings following soil inoculation with isolates 1 and 3 [loc. cit.].

Henderson (F. Y.). **Report of the Director of Forest Products Research for the year 1958.**—*Rep. For. Prod. Res. Bd, Lond., 1958*, vi+64 pp., 8 pl., 1 fig., 4 graphs, 1959. 5*s*.

In the mycology section (pp. 29–32) of this report [cf. **37**, p. 606] it is stated that out of 490 cultures maintained for 8 yr. under mineral oil only 5 failed to grow on subculturing, while a number of oiled strains were more vigorous than comparable strains subcultured regularly every 3 months.

A soft rot causing decay in a standing tree (sapele (*Entandophragma cylindricum*) from Ghana) has been again recorded. Cellulolytic fungi, *Myrothecium verrucaria* and *Memnoniella echinata* attacked beech in pure culture. Of the fungi isolated by 'baiting' with beech in various soils *Trichoderma viride*, *Fusarium* sp., *Actinomucor repens*, and other mucoraceous spp. were incapable of attacking wood in pure culture but *Stachybotrys atra*, *Sporocybe* sp., *Sordaria* sp., and *Gelasinospora* sp. all attacked beech wood in the presence of nutrient salts. Spp. of *Chaetomium* and *Stysanus*, already known as soft-rot fungi, were also frequently isolated. *T. viride*, *C. globosum*, and mucoraceous spp. quickly colonized susceptible wood buried in the soil, but though *T. viride* produced antibiotic compounds it did not markedly reduce the ability of *C. globosum* to attack wood. Beech blocks (0·5 cm. thick) exposed for 3 years to R.H. 90% at an equilibrium moisture content of 22·5% showed soft rot throughout their thickness and had lost 20% of their original dry wt., but there was no appreciable loss from blocks maintained at 21·5% moisture; submerged blocks lost 12%, but soft rot had not completely penetrated them.

Decay by *Poria nigrescens* in western red cedar (*Thuja plicata*) and by *Gloeocysti-*

dium lactescens in Scots pine (opt. growth temp. 28° C.) has occurred in mist eliminators in cooling towers. Tests for residual toxicity of wood preservatives showed that treatments with creosote, 4% sodium pentachlorophenate, and 5% sodium *o*-phenylphenate remained effective after 18 months' exposure; the conc. of creosote required for protection, in comparison with copper naphthanate, was much higher for unsterilized than sterilized soil; *Sporocybe* sp., amongst other organisms, appears more tolerant of creosote than *C. globosum*.

Lasiodiplodia [*Botryodiplodia*] *theobromae* [**38**, p. 167], a most important fungus causing sap-stain in tropical hardwoods, could penetrate 15 cm. along the grain in horse-chestnut wood in 12 days at 22° C., but only 4 cm. across the grain in 6 weeks. Prolonged steaming increased susceptibility of some woods to moulds, in particular poplar; this was probably due to the breaking down of complex polysaccharides which are then more readily assimilated by the moulds.

Annual Report of the Forest Insect and Disease Survey, Canada Department of Agriculture, 1958.—114 pp., 11 maps, 1959.

In the section of this report [cf. **37**, p. 601] dealing with forest diseases in the Atlantic Provinces (pp. 25–29) by A. G. Davidson and W. R. Newell, *Stereum sanguinolentum* [**38**, p. 105] is stated to be the commonest fungus in the tops of balsam fir [*Abies balsamea*], black spruce [*Picea mariana*], larch, and jack pine [*Pinus banksiana*]; in the first 2 the decay extended into the trees an av. of 1·1 and 1·6 ft., respectively. *S. purpureum* and *Polyporus zonatus* were identified most commonly from trembling aspen [*Populus tremuloides*]. Resinosis of white pine [*Pinus strobus*], of unknown cause, but not causing serious damage, was observed in all white pine stands examined in the Maritime Provinces. Noteworthy new records included *Taphrina confusa* on chokecherry [*Prunus virginiana*] and *Cephalosporium* sp. and *Verticillium* sp. both causing a wilt disease of elm.

From Quebec R. Pomerleau (pp. 34–37) reports that in a 15 yr.-old white pine plantation out of 903 trees examined, 15 were killed, 52 dying, 288 seriously attacked, and 190 lightly infected by blister rust (*Cronartium ribicola*) [**37**, p. 686]. *Taphrina carnea* is a new record on birch.

J. Reid (pp. 57–60) reports dieback of hard maple [*Acer saccharum*] in Ontario, first noticed in 1957, with the following symptoms: interveinal chlorosis, marginal browning sometimes resembling autumn tints, complete browning and death of the leaves with premature leaf fall, death of young twigs followed by death of part or all of the crown, and killing of the leaders at an early stage on both old and young trees. No primary pathogen has yet been isolated. The occurrence of *Xylaria polymorpha* on maple, *Daldinia concentrica* on alder, and *D. vernicosa* on cherry constitute new host records for Ontario.

From Saskatchewan H. Zalasky (pp. 72–73) reports that *C. ribicola* was discovered in S.E. Manitoba, the only place where eastern white pine occurs in the Prairie Provinces. *Armillaria mellea* was apparently responsible for a decline in tamarack [*Larix laricina*], and trees 3–8 in. D.B.H. in affected stands S. and E. of Cold Lake were dying in appreciable numbers.

A. A. Loman and R. J. Bourchier (pp. 81–83) record *C. ribicola* on limber pine (*Pinus flexilis*) in Waterton Lakes National Park, Alberta, for the 1st time. On the basis of the frequency of their isolation from decayed wood the relative importance of the fungi associated with decay in aspens [**38**, p. 39] and balsam poplar [*Populus balsamifera*] was as follows: in the former, *Fomes igniarius* var. *populinus*, *Corticium polygonium*, *Libertella* sp., and *Radulum casearium*, + 6 other spp. and in the latter *L.* sp., *F. i.* var. *populinus*, and *Pholiota spectabilis*, + 2 other spp.

In British Columbia A. C. Molnar (pp. 97–103) reports an unusually severe outbreak of needle blight caused by *Elytroderma deformans* [cf. **38**, p. 547], affecting in particular yellow pine [*Pinus ponderosa*], and to a less extent lodgepole pine [*P.*

contorta var. *latifolia*]. Needle blight (*Rhabdocline pseudotsugae*) of Douglas fir [*Pseudotsuga menziesii*: **23**, p. 4] reached the highest intensity of infection recorded since 1950 in the E. Kootenay region. The incidence of *Pullularia pullulans* on white spruce [*Picea glauca*] has greatly increased, apparently due to the fact that spruce budworm (*Choristoneura fumiferana*) frass provides an excellent growth medium for the fungus.

New records for the area include *Eutypa acharii* associated with dieback of black cottonwood [*Populus trichocarpa*], *Merulius himantioides* on fir ([*Abies*] *amabilis*), and *Melampsora medusae* on western larch [*Larix occidentalis*]; *Peridermium harknessii* on Scots pine [*Pinus sylvestris*: **37**, p. 320] is also noted.

Gualaccini (F.). **Una virosi nuova del Castagno.** [A new virosis of Chestnut.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **16** (*1958*), 1, pp. 67–75, 4 pl. (14 fig.), 1959. [English summary.]

The investigations have already been noticed [**38**, p. 357].

Wester (H. V.) & Jylkka (E. W.). **Elm scorch, graft transmissible virus of American Elm.**—*Plant Dis. Reptr*, **43**, 5, p. 519, 1959.

Foliar necrosis, associated with gradual crown deterioration and failure, has become more widespread in elms in Washington, D.C., and in S.E. States in recent years. It is transmissible by chip bud and scion inoculum, but not by bark patches, and is therefore considered to be caused by a virus which develops in the xylem and not in the phloem, possibly related to that causing Pierce's disease of grape [lucerne dwarf virus: **37**, p. 629].

Matuo (T.). **Pathological studies of the 'bud blight' of Mulberry trees. IV. Physiological characters of the causal fungus, Gibberella lateritium (Nees) Snyder et Hansen.**—*J. Fac. Text. Seric. Shinshu Univ.*, **17**, Ser. A, 8, pp. 17–42, 6 graphs, 1958. [18 ref.]

The cardinal temps. for the vegetative growth of *G. lateritia* [cf. **37**, p. 564] were: min. slightly < 4°, opt. 24–26°, max. about 36° C. Sporodochia were formed on mulberry stem media at 4–32° (opt. 24–30°) and perithecia at 4–30° (opt. 7–14·5°); both developed more easily on moist than on dry mulberry stems, and in light. New macroconidia were formed on sporodochia after 1 day at R.H. 94·8% or more, and after 3 days at 85%; opt. temp. for their germination was 24–26°, and at R.H. 100%. Germination fell markedly at R.H. 97·5–85 and ceased at 80%. The longevity of the macroconidia decreased with R.H. and fell to 3–4% after 100 days at 49%, though still 59% at 100.

Schoenweiss (D. F.). **Xylem formation as a factor in Oak wilt resistance.**—*Phytopathology*, **49**, 6, pp. 335–337, 2 fig., 1959.

Much of this information from Ohio Agricultural Experiment Station, Wooster, on *Ceratocystis fagacearum* has been reported [cf. **38**, p. 489]. The sections of naturally and artificially infected branches were stained with safranin O and 1% picro-aniline blue.

Phelps (W. R.). **The chemotherapy of Oak wilt.**—*Diss. Abstr.*, **19**, 8, pp. 1884–1885, 1959.

Of several antibiotics and chemicals tested at the University of Wisconsin [**37**, p. 741] which prevented conidial germination and mycelial growth of *C*[*eratocystis*] *fagacearum* [cf. above] on agar (though the former were more resistant), phenyl mercuric compounds, vancide 51, dithane D-14, crystal violet, malachite green, 8-hydroxy quinoline benzoate, sodium azide, phytoactin, oligomycin, and actidione

and several derivatives were active at 10 p.p.m. At low conc. (0·01 p.p.m.) conidial germination and formation of secondary conidia were stimulated by the antibiotics. Injection of antibiotics (especially oligomycin, phytoactin, and actidione) and chemicals (2-mercaptobenzothiazole, benzoic acid, indole 3-acetic acid, and sodium azide) into trunks prolonged the incubation period from 3 weeks to 12 months. Actidione and oligomycin were both systemically translocated, but actidione was absorbed and translocated more quickly and in bigger amounts; it was detected in oak 3 weeks after injection and oligomycin after 4 weeks. Soil drenches in 1 trial prolonged the incubation period for at least 12 months: leaf-sprays were ineffective. Best prevention resulted when inoculations were made at or just after treatment in a lateral branch or near the place of treatment when inoculum was less than 100,000 conidia/tree, and when adequate soil drenches were employed. Single treatments of high conc. or annual spring applications reduced percentage infection and prevented or reduced fungus mat formation. Treatment for 2 years in May or early June of healthy trees within root grafting distance of diseased trees reduced greatly the spread of disease into them.

Urošević (B.) & Jančařík (V.). **Ophiostomose und Eichenwurzeltöter (Rosellinia quercina Hartig) zwei wichtige Krankheiten der Eichensämlinge.** [Ophiostomosis and the Oak root killer (*R. quercina*), two important diseases of Oak nurseries.]—*Z. PflKrankh.*, **66**, 4, pp. 194–199, 6 fig., 1959. [English summary.]

A similar paper has been seen from another source [**37**, p. 423]. The *Ophiostoma* sp. described is considered here to be distinct from other known spp., including *O. valachicum* [cf. loc. cit.].

Wilson (C. L.). **The Columbian timber beetle and associated fungi in White Oak.**—*For. Sci.*, **5**, 2, pp. 114–127, 32 fig., 1959.

Ceratocystis piceae [**38**, p. 41] and *Pichia* sp. were consistently associated with the Columbian timber beetle (*Corthylus columbianus*) which affected 50–75% of the white oaks (*Quercus alba*) in Western Virginia. *Ceratocystis piceae* was found in beetle galleries and larval cradles; *P.* sp., which was readily isolated from crushed beetles, grows primarily in larval cradles. Perithecia of *C. piceae* were often found in old galleries. A *Fusarium* sp. was also frequently isolated from the current galleries and stained wood; the wood stains produced by *C. piceae* and *F.* sp. artificially inoculated into wood were indistinguishable. Isolations from old galleries and stains in felled trees yielded *Ascocybe grovesii* [cf. **34**, p. 332], which is considered a secondary invader, probably entering through cut surfaces after felling. It is thought that the original staining organisms predispose wood for the growth of other fungi. The entry wounds made by *Corthylus columbianus* are recognized as possible infection courts for pathogenic fungi, but the localized distribution of the beetle within a stand limits its function as an efficient vector.

Barnes (G. L.). **Effectiveness of certain protectant fungicides for controlling Pecan scab during a severe scab season in Oklahoma.**—*Plant Dis. Reptr*, **43**, 4, pp. 487–490, 1959.

In a further fungicidal test by the U.S. Dept Agric. and Oklahoma Agricultural Experiment Station, Stillwater, against pecan scab (*Fusicladium effusum*) [**37**, p. 610] on var. Squirrel during the severe scab season of 1958, 8 sprays (all at 1·5 lb. active ingredient/100 gal.) of dyrene gave 22% shuck surface scabbed, parzate 20, manzate 60, zerlate 96, and the unsprayed 100%, with the numbers of nuts/lb. 113, 114, 162, 207, and too diseased to measure. In a test on Western with zerlate only, but varying the number of applications, the heavier nuts came from trees which received the earlier and greater number.

Bloomberg (W. J.). **Some physiological and anatomical characteristics of Populus spp. as related to infection by Cytospora chrysosperma Fr.**—*Bi-m. Progr. Rep. Div. For. Biol. Dep. Agric. Can.*, **15**, 2, p. 3, 1959.

C. chrysosperma [*Valsa sordida*] was detected in *P. trichocarpa*, a native sp., and 2 hybrids, *P. regenerata*, and *P. robusta* var. *bachelieri* growing in a nursery on Lulu Island, British Columbia. In the 3 spp. there was a negative correlation between bark moisture content and canker growth [**38**, p. 631], which was further confirmed by the differences in canker growth at 3 levels of moisture content of cuttings and of temp. Greenhouse experiments with 4-month-old *P. regenerata* and *P. robusta* showed that infection could be obtained only when the plants were subjected to drought and low atmospheric humidity. Anatomical differences in the wood and bark tissues of the 3 spp. [**38**, p. 490] suggest a basis for the differences in water economy and, hence, differences in physiological resistance to infection [cf. **38**, p. 427].

Pourtet (J.). **Le dépérissement des Peupliers dans le Nord-Est de la France au printemps 1958.** [The dying-off of Poplars in the N.E. of France in the spring of 1958.]—*Rev. for. franç., 1958*, 8–9, pp. 521–525, 1958.

This is a detailed study of the topographical and climatic factors involved in an outbreak of infection by *Dothichiza populea* [**38**, p. 341] and other fungi, as yet unidentified, mostly on var. Robusta upwards of 20 yr. old in low-lying areas, e.g. in the departments of Aube, Haute Marne, Meurthe-et-Moselle, Haute Saône, and Vosges [map 344].

Miller (P. W.). **A preliminary report on the comparative efficacy of copper-lime and agrimycin dust mixtures for the control of Walnut blight in Oregon.**—*Plant Dis. Reptr*, **43**, 3, pp. 401–402, 1959.

At Oregon Agricultural Experiment Station, Corvallis, 4 applications of agrimycin-Cu dust at 10-day intervals starting at early pre-bloom gave the best control of walnut blight [*Xanthomonas juglandis*: cf. **27**, p. 590; **35**, p. 616]. In 1957 there were 11% infected nuts compared with 30·1% on the unsprayed, and moderate foliage injury, and in 1958 3·9 compared with 25·7, and no injury. Cu+lime+S+oil dust (15–30–10–1·5) gave 10·9% infected nuts in 1957 and 6·8 in 1958, with only a trace of injury.

Leaphart (D.) & Gill (L. S.). **Effects of inoculations with Leptographium spp. on Western White Pine.**—*Phytopathology*, **49**, 6, pp. 350–353, 4 fig., 1959.

In further studies 7 isolates of *Leptographium* [cf. **31**, p. 306; **36**, p. 148] were used in some 2,300 inoculations of the roots and stems of 321 trees of *Pinus monticola* in Idaho and Washington over 3 yr.; 7 of the 9 inoculation areas were in stands at the most susceptible stage (40–100 yr.), 1 at 15 yr., and 1 at 175 yr. Of a series of techniques, application of the inoculum (usually on malt agar) to bark punctures made with a needle or scalpel and covering with moist sterile cotton and cellophane was most successful. Attempts to impair host vigour by root pruning were without effect. The degree of cambial necrosis caused by different isolates varied considerably; callusing round the edges of the lesions generally began within 1 yr. The longest trunk lesion was 36 in., the av. about 6 in.; largest root lesion was 28 × 1 in. The results indicated that the ability of the fungus to cause damage is inversely proportional to the ability of the tree to form callus, that the pathogen contributes to deterioration of the structural root systems of pole-blight-affected stands [cf. **38**, p. 551], and that the virulence of the form of *L.* present may be correlated with the lesion development pattern and the tree's rate of decline.

Bakshi (B. K.), Singh (B.), & Choudhury (T.). **Occurrence of Merulius himantioides in India.**—*Indian Phytopath.*, **11**, 1, pp. 25–28, 1 pl., 1 fig., 1 diag., 1958.

A brief account is given of a study at the Forest Research Institute, Dehra Dun, of the sporophore, cultural characters, and sexuality of *M. himantioides* [cf. **38**, p. 62] from deodar and spruce (*Picea morinda*) [**37**, p. 604]. The subhymenial layer is not gelatinized, as it is in *M. americanus*.

Boyce (J. S.). **Brown spot needle blight on Eastern White Pine.**—*Plant Dis. Reptr*, **43**, 3, p. 420, 1959.

At the Forest Service, Asheville, N. Carolina, partial die-back of current needles on eastern white pine (*Pinus strobus*) [cf. **29**, p. 235] has been recorded in some instances as due to *Scirrhia acicola* [**37**, p. 190; **38**, p. 39], previously regarded as an important cause of needle blight only on long leaf pine (*P. palustris*) seedlings.

Kenaga (D. L.) & Cowling (E. B.). **Effect of gamma radiation on Ponderosa Pine : hygroscopicity, swelling, and decay susceptibility.**—*For. Prod. J.*, **9**, 3, pp. 112–116, 1959.

This study at the Dow Chemical Co., Michigan, was designed to evaluate the effects on wood of the γ-radiation emitted by Co^{60}, which is being increasingly used to alter or improve the properties of high polymer materials. The results of decay susceptibility tests, using *Lenzites trabea*, indicate that radiation below 10^7 rep, applied at the dose rates and moisture contents studied, induced small but statistically significant changes in the sapwood. In both tests (4 and 9 weeks) doses below 10^6 rep reduced susceptibility, while larger total doses increased it. These results confirm the generalization that doses in excess of 10^6 rep have the most pronounced degradative effects on wood, but the magnitude of the effects suggests that irradiated wood does not present a markedly greater hazard than unirradiated. In the design of future radiation experiments where max. precision is required, however, significant variables and interactions will need to be considered. Most of the significant interactions encountered could probably be avoided by irradiating blocks only at moisture contents well below saturation.

Linn (M. B.). **Vegetable diseases.**—*Circ. Ill. Coll. Agric.* 802, 64 pp., 78 fig., 1958. [Received June 1959.]

In this useful, well-illustrated publication sections on each type of vegetable contain symptom descriptions of the principal diseases followed by accounts of disease development and control measures. A section at the end is devoted to general control measures, with a useful table of common, chemical, and proprietary names of the more general current fungicides, one of treatments for vegetable seed, and some notes on equipment.

Rogers (I. S.) & Baskett (W. J.). **Disinfection treatments for vegetable seeds.**—*J. Agric. S. Aust.*, **62**, 11, pp. 500–503, 510, 5 fig., 1959.

Following a discussion of the different causes of germination failure and appropriate control measures the authors describe the methods for the hot water treatment, fermentation seed extraction, and chemical treatment of seed. Vegetable diseases that can be controlled by seed treatment are listed and recommendations for certain crops are outlined.

Meier (W.). **Über die durch die Vergilbungskrankheit bei Zuckerrüben in den Jahren 1956 bis 1958 im schweizerischen Mittelland verursachten Schäden**

und die Wirkung von Bekämpfungsmaßnahmen. [On yellows damage to Sugar Beet in the central Swiss plain in the years 1956–58 and the effect of control measures.]—*Annu. agric. Suisse*, (**73**, ed. fr. **60**), N.S. **8**, 1–2, pp. 1–20, 1959. [French and English summaries.]

From the results of 11 field experiments conducted by the Eidgenössische Landwirtschaftliche Versuchsanstalt, Zürich-Oerlikon, it was concluded that with early sowing losses from beet yellows virus [**36**, p. 676; **38**, p. 379] were without practical significance, but with late sowing they were sometimes high. Chemical control of aphids (*Aphis fabae*, *Myzus persicae*) reduced infection, but with the low incidence was not economic. Estimation by the method of Steudel & Heiling [**34**, p. 12] indicated yellows attacks in the central plain (between the Alps and Jura) to be light.

Schneider (C. L.). **Occurrence of curly top of Sugar Beets in Maryland in 1958.**—*Plant Dis. Reptr*, **43**, 7, p. 681, 1959.

Beet curly top virus [map 24], reported in recent years from other central States [**33**, p. 516; **35**, pp. 339, 552; **38**, p. 435], including Ohio, has now been observed at Beltsville, Maryland, but the vector (*Circulifer tennellus*) has not been found there.

Schuster (M. L.), Jensen (S. G.), & Sayre (R. M.). **Toothpick method of inoculating Sugar beets for determining pathogenicity of Rhizoctonia solani.**—*J. Amer. Soc. Sug. Beet Technol.*, **10**, 2, pp. 142–149, 1958. [*Biol. Abs.*, **33**, 8, p. 2561, 1959.]

In field tests with different strains of *R.* [*Corticium*] *solani* [**36**, p. 156] by the toothpick method, promising in ascertaining the reaction of var. and spp. of *Beta* and other plants, determination at the seedling stage did not truly depict mature plant reaction to the crown rot phase. The isolates were pathogenic, non-pathogenic, or intermediate in reaction on sugar beet. Some strains retained their pathogenicity on artificial media for over 7 yr. The possibility of employing a single strain of *C. solani* for tests is discussed.

Zaumeyer (W. J.) & Patino (G.). **A recently discovered virus-induced streak of Peas.**—*Plant Dis. Reptr*, **43**, 7, pp. 698–704, 8 fig., 1959.

A more detailed account is given from the U.S. Dept Agric. of this virus in southern Idaho [**38**, p. 48]; it is closely related to other pea streak viruses [**38**, p. 554] and to a virus of sweet clover in Germany [**36**, p. 532; **38**, p. 173] and is regarded as a str. of pea streak virus. The symptoms include a purple, necrotic streaking of the stem and are more marked in the field than in the greenhouse. All 119 pea vars. and strains inoculated proved susceptible, as did 7 of 43 plant spp. (2 of 8 families) tested. The Idaho virus is distinguished from pea streak virus 1 [**17**, p. 721] by its inability to infect lucerne, crimson and red clover, and *Vicia sativa*, and by infecting soybean and *V. villosa*.

Lockwood (J. L.) & Ballard (J. C.). **Factors affecting a seedling test for evaluating resistance of Pea to Aphanomyces root rot.**—*Phytopathology*, **49**, 7, pp. 406–410, 2 graphs, 1959.

At Michigan Agricultural Experiment Station, East Lansing, Miragreen pea seedlings grown in sand without nutrients were inoculated by pipetting zoospore suspensions of *A. eutiches* [cf. **38**, p. 173] beside the row. Disease indices of 0–8 were based on ratings of tops, epicotyls, and roots 8–12 days later. Disease was max. and variability least with a sowing depth of 2 cm., seedling age 4–6 days (2–5 cm. high), inoculation once, as near the row as possible, with 10 ml./10 in. row of a

suspension of $1{\cdot}5 \times 10^5$/ml. of zoospores 2–14 hr. old (culture 4–5 days old), on a sand medium containing 4–6 lb. water/32 lb. before inoculation and saturated once afterwards, and at a sand temp. of 24° C. Zoospores decrease in infectivity after 24–48 hr. in sand and any healthy seedlings emerging 24 hr. after inoculation should be regarded as escapes.

Jacks (H.). **Seed disinfection. XV. Glasshouse tests for control of damping-off of Pea seed.**—*N.Z. J. agric. Res.*, **2**, 2, pp. 306–311, 1959.

Further studies in this series [cf. **36**, p. 248] at Massey Agricultural College, Palmerston North, concerned the effect of 11 seed dressings at 0·25% seed weight on emergence, rate of growth, and post-emergence infection of 11 vars. of pea grown in soil inoculated with *Pythium ultimum* [cf. **36**, p. 507]. Phygon and orthocide 75 gave the greatest protection, with significantly higher total emergence percentages generally. Speed of emergence was also accelerated.

Schneider (I. R.) & Worley (J. F.). **Upward and downward transport of infectious particles of southern Bean mosaic virus through steamed portions of Bean stems. Rapid entry of infectious particles of southern Bean mosaic virus into living cells following transport of the particles in the water stream.**—*Virology*, **8**, 2, pp. 230–242, 3 fig.; pp. 243–249, 1 fig., 1959.

This is a more detailed account of work at Beltsville, Maryland, already noticed in part [**37**, p. 617]. Infectious particles of the virus which moved from infected living cells into the tracheal system of Pinto beans (*Phaseolus vulgaris*) were transported more frequently and rapidly, and usually to a greater distance, upward than downward. It is concluded that in the Pinto bean the virus can move over long distances in both xylem and phloem. In the 2nd study the virus was needle-injected into the deep tissues of Pinto bean stems 'at least 1 internode above or 1 internode below a steam-treated internode (the 1st or 2nd internode above the primary leaf node)'. Upward or downward movement was detected by inspecting the trifoliate leaves or the petioles above and below the steamed part for the characteristic vein necrosis.

Infectious particles moved upwards in the water stream, entered undamaged living cells, and multiplied: in some plants the time required to enter living cells several ft. from the inoculation site was 1 day or less. Local infection at the inoculation site was not a prerequisite for the occurrence of remote infections. Introduction of the virus into an internode well above the hypocotyl frequently caused necrosis in foliage above the site of inoculation but rarely in that below it. These results indicate rapid upward transport of infectious particles in the water stream and entry into living cells.

Natti (J.). **A systemic disease of Beans caused by a Tobacco necrosis virus.**—*Plant Dis. Reptr*, **43**, 6, pp. 640–644, 2 fig., 1959.

A more detailed account of information already noticed [**38**, p. 494].

Maloy (O. C.). **Microbial associations in the Fusarium root rot of Beans.**—*Diss. Abstr.*, **19**, 10, pp. 2441–2442, 1959.

At Cornell University it was found that the populations of *Fusarium solani* f. sp. *phaseoli* [cf. **37**, p. 618] in fields of different cropping history were not markedly different. Very small quantities of inoculum, e.g. 1 spore/g. soil, produced as much as 100% infection in beans [*Phaseolus vulgaris*]. No relationship was observed between the prevalence of certain nutritional groups of bacteria and the severity of root rot, nor did nematodes appear to be important in facilitating the initiation or intensification of infection. Differences in the severity of root rot may be partly due to the activity of secondary invaders, since populations of the fungus were lower in soils where the infection was severe than where it was moderate. Lucerne

residues had a toxic effect on bean plants. Where wheat was the previous crop, root rot severity was considerably lower than with other common rotation crops.

In a study of bean roots at various times and in soils of different histories 3 potentially pathogenic fungi were found on or in the roots. Their frequency of occurrence and that of nematodes appeared to be related to the age of the roots. In field and greenhouse experiments there were both qualitative and quantitative differences between the types of fungi in the roots of beans grown after various plants and in soils amended with manure or sawdust. The fungi isolated from roots, commonly *F. oxysporum*, were generally different from those seen under the microscope. Those isolated soon after planting utilized only glucose and other simple sugars; those isolated at intermediate times utilized both cellulose and glucose, while those from the later samplings were able to utilize lignin as well. The severity of root rot induced by mixtures of 4 root rot fungi was not significantly greater than that induced by *F.s.* f. sp. *phaseoli*. The root rot pathogen was isolated least frequently from the margin of lesions and *Alternaria* sp. most frequently. Root rot was less severe in beans following certain non-host crops than following beans, though the populations of the pathogen were comparable. Root extracts from wheat and lucerne plants, whose use in rotation had resulted in low severity of root rot, selectively stimulated the less pathogenic mycelial (M) type of growth of *F.s.* f. sp. *phaseoli*, in contrast to the conidial (C) type. The M type made better growth on a larger number of the carbohydrates tested than did the C type and was tolerant of more antibiotics and higher concs. thereof. It was predominant in soil where the supply of nutrients was limited.

Huber (D. M.) & Finley (A. M.). **Gliocladium, a causal agent in the Bean root rot complex in Idaho.**—*Plant Dis. Reptr*, **43**, 6, pp. 626–628, 1 fig., 1959.

At Idaho Agricultural Experiment Station, Moscow, 64 bean [*Phaseolus vulgaris*] plants in plots for the study of root rot yielded 29 isolates of *Fusarium solani* f. sp. *phaseoli* [cf. above], 21 of *G. roseum*, and 14 mixtures of these 2 fungi. Bean seedlings sown in the greenhouse in sand or soil artificially infested with *G. roseum* developed reddish-dark brown lesions on the roots and hypocotyl; lateral and secondary roots died. Discoloration and plugging of the vascular elements distinguished the rot from that caused by *F.s.* f. *phaseoli*. The disease was more severe in sand than in soil; *G. roseum* is, however, not normally as virulent as *F.s.* f. *phaseoli*.

Hartwig (E. E.). **Effect of target spot on yield of Soybeans.** –*Plant Dis. Reptr*, **43**, 4, pp. 504–505, 1959.

In the Mississippi Delta losses from target spot (*Corynespora cassiicola*) [**37**, p. 199] in experimental plantings of soybean ranged from 18 to 32% in 1949–51 and 1957–8. Owing to lower rainfall in Aug.–Sept. in 1951–56 disease was less and there was no defoliation. In 1949 susceptible vars. yielded 30% and in 1957 18% less than the resistant at Stoneville. In 1950 the mean yield from 42 resistant lines was 43·5 bush./acre while that of 19 susceptible lines was 30·8 bush., the susceptible averaging 29% less. The disease is considered to be potentially more serious for vars. maturing during Oct. or later. There was a yield reduction of 29% when all leaves were removed 21 days before maturity, and 17% at 14 days.

Dutta (P. K.). **The effects of previous crops on growth, yield, and certain chemical constituents of two Soybean varieties.**—*Diss. Abstr.*, **19**, 11, pp. 2707–2708, 1959.

During 1957 brown spot disease (*Septoria glycines*) [**32**, p. 166] at the University of Minnesota was more than 3 times as severe on Ottawa Mandarin and Renville soybeans after soybeans than after maize, oats, wheat, or flax.

Geard (J. D.). **Diseases of Onions.**—*Tasm. J. Agric.*, **30**, 2, pp. 165–169, 4 fig., 1959.

Diseases dealt with are white rot (*Sclerotium cepivorum*), the most serious on onion in Tasmania, damping-off (mostly *Pythium* spp.), downy mildew (*Peronospora destructor*) [map 76], not serious unless cool moist weather with frequent rain or dew occurs, and neck rot (*Botrytis* spp.) [maps 164, 165]. Basal rot (*Fusarium* sp.) is of minor importance but may appear in areas which have been intensively cropped with onion for years.

Soil sterilization and seed treatment with thiram or spergon to reduce damping-off, a sufficient interval between autumn and spring crops to avoid carry over of downy mildew (also controlled by zineb + a wetting agent), avoidance of excessive N application, careful drying of necks, and inspection at harvest to avoid storage losses are recommended.

Szirmai (J.). **A Salátamozaik meghonosodása Magyarországon.** [Lettuce mosaic virus in Hungary.]—*Növénytermelés*, **6**, 3, pp. 225–232, 5 fig., 1957. [Russian and English summaries. Received Sept. 1959.]

Investigation by the Plant Protection Research Institute, Budapest, on the extent of lettuce mosaic virus, first observed in Hungary in 1950, showed that the worst damage occurs in seed growing areas where infection may reach 80%. On the cotyledons of some vars. irregular necrotic spots develop, in the absence of fungal or bacterial infection. By pregerminating the seed for 24 hr. at 23° C. and removing the testa the extent of cotyledon necrosis was determined in 2 vars. Standard tests failed to demonstrate the presence of the virus in such seed, but the proportion of necrosis indicated the degree of infection in the mother plant. It is suggested that this necrosis is due to the inherently hypersensitive nature of the seed and floral parts. The virus is not demonstrable until the 3–4 leaf stage.

Mortensen (J. A.). **The inheritance of Fusarium resistance in Muskmelons.**—*Diss. Abstr.*, **19**, 9, p. 2209, 1959.

One of the aims of this study at Cornell University was to elaborate a method for testing muskmelons for resistance to *Fusarium* [*bulbigenum* var. *niveum*: cf. **37**, p. 753] in the greenhouse, such that susceptible vars. would be killed and resistant vars. remain healthy. This was achieved by growing the plants in $2\frac{1}{2}$ in. pots of non-infested soil and transplanting to infested soil with the soil ball intact: direct seeding into infested soil or transplanting bare-rooted sometimes led to the death of resistant plants. In some instances plants which were older at the time of transplanting proved more resistant than younger ones, while in others there was no such correlation. The disease was inhibited by the high temp. of summer. For resistance testing a constant soil temp. of 30° C. was better than 16°, because many resistant plants were killed at the lower temp. In hot summer weather infection of susceptible vars. was incomplete; in midwinter there was some killing of resistant vars.; testing was more reliable during spring and late Aug. The methods of inoculation which proved best were the layer method, in which 10–15 g. of wheat inoculum was placed beneath each plant at the time of transplanting, and the injection method, the stem of each plant being injected with a conc. spore suspension.

In both field and greenhouse resistance was dominant in all crosses. Provisionally, a hypothesis of a principal dominant gene (R) plus 2 complementary dominant genes (A, B) is in accordance with all data: A and B are assumed to produce a resistant phenotype in the absence of R. Combinations giving resistance under this hypothesis are listed.

DeZeeuw (D. J.) & Burton (C. L.). **Soil treatments in relation to Verticillium wilt of Eggplant.**—*Quart. Bull. Mich. agric. Exp. Sta.*, **41**, 4, pp. 848–852, 1 fig., 1959.

This wilt (*V. alboatrum*) [cf. **37**, p. 625] causes heavy yield losses or even crop

failures for a number of growers in Michigan. In the present study, carried out in 1957 and 1958 on low-lying plots in an endemic area, the soil was treated with chloropicrin (3 ml. injected to a depth of 6 in. at 12 in. centres, holes pressed shut and additionally sealed with about ½ in. of irrigation water), urea-formaldehyde, mylone, CP–272 (12½% wettable powder of trans-1-2-bis (ethyl sulphonyl)ethylene. Chemagro Corp.), CP–376 (4 lb./gal. emulsifiable concentrate *o*-nitrichlorobenzene. Monsanto), or EP–131 (experimental, not specified), in the last week of May, planting with greenhouse-grown sets being complete on June 15. While plot variability was too great in 1957 to permit any final conclusions, the 2 first-mentioned fungicides were beneficial and CP–272 was injurious. In 1958 field variability was excessive and none of the materials reached the 5% level of statistical significance, but it seemed probable that under severe disease conditions chloropicrin would have given significant control.

Chant (S. R.) & Beck (B. D. A.). **The effect of Cassava mosaic virus on the anatomy of Cassava leaves.**—*Trop. Agriculture, Trin.*, **36**, 3, pp. 231–236, 6 fig., 1959.

At the Federal Dept of Agricultural Research, Moor Plantation, Ibadan, Nigeria [cf. **38**, p. 346], healthy leaves of cassava were compared with mosaic-infected leaves [cf. **11**, p. 761]. The palisade tissue in chlorotic lesions is undifferentiated, and the chloroplasts in such tissue are fewer, abnormal in shape, and stain less intensely with iodine-KI solution. The phloem in the midrib of infected leaves is restricted to small bundles, though there is no evidence of necrosis of the sieve tubes. There were no inclusion bodies in the epidermis of infected leaves.

John (V. T.). **Root and nodule development in Dolichos lablab L. infected with Dolichos enation mosaic virus.**—*Curr. Sci.*, **28**, 5, p. 211, 1 fig., 1959.

Studies at the University Botany Laboratory, Madras, India, showed that a reduction in root nodule development in *D. lablab* was directly related to the degree of infection by the virus [**27**, p. 309; **35**, p. 282] in inoculated plants.

Caltrider (P. G.). **Factors affecting growth and sporulation of Guignardia bidwellii.**—Abs. in *Proc. W. Va Acad. Sci.*, **30** (*1958*), p. 142, 1959.

On a synthetic medium C and N sources favouring growth of the fungus [cf. **37**, p. 389] generally favoured sporulation also. Germination of conidia was influenced by nutrient conc., pH, and temp. The opt. temp. for production of spermatia and pycnosclerotia was higher than that for the production of conidia, which required continuous light for good yields. Sexual organs developed on grapes grown under greenhouse conditions after natural and artificial inoculation with a single isolate, but not in culture. In spray timing trials [fungicide unspecified] the post-blossom application proved the most important.

Bier (M.) (Editor.) **Electrophoresis, theory, methods, and applications.**—563 pp., Academic Press, New York, 1959. $15. [*Biol. Abstr.*, **33**, 9, p. 2625, 1959.]

This is a useful collection of papers outlining the fundamental principles involved in electrophoresis, the problems connected with it, and the means of solving them, which are further illustrated by detailed laboratory procedures. C. C. Brinton & M. A. Lauffer contribute an article on viruses, bacteria, and cells, and the microscope method of electrophoresis.

Voronkevich (I. V.) & Melikova (Mme S. A.). Выживаемость и изменение свойств некоторых фитопатогенных бактерий в воде. [Survival of and changes in the properties of some phytopathogenic bacteria in water.]—*J. gen. Biol., Moscow*, **20**, 1, pp. 61–72, 1959. [English summary.]

At the Moscow Station of the All-Union Institute of Plant Protection, tap water

($4–7 \times 10^2$ microbial cells/ml.) proved unsatisfactory as a medium for the survival of *Erwinia carotovora*, *E. aroideae*, *Pseudomonas citriputeale*, and *Xanthomonas vesicatoria*. Strains mainly non-pathogenic and non-agglutinable by specific serums were isolated from non-sterilized tap water inoculated with these spp., the majority being similar to bacteria present in non-infected water, though some (isolated during the 1st 3–4 months) were similar to the original strains. Unsterilized water containing these spp. became non-infective to plants during the 1st 10 days. Bacteria introduced into sterilized tap water retained their properties and pathogenicity for 2 yr. and in general their behaviour was similar to that in soil.

Polishchuk (L. K.), Batrak (A. P.), & Bilyk (L. G.). Про вплив фітонцидів Волоського Горіха на деякі фітопатогенні бактерії. [On the influence of phytoncides of Walnut on some phytopathogenic bacteria.]—*J. Microbiol., Kiev*, **21**, 3, pp. 25–30, 1959. [Ukrainian with Russian summary.]

At the Dept of Plant Physiology, Kiev State University, and the Section for Plant Bacterioses of the Institute of Microbiology, *Xanthomonas phaseoli* and its var. *fuscans*, *X. campestris*, *X. malvacearum*, *Corynebacterium flaccumfaciens*, *C. michiganense*, *X. beticola*, *Pseudomonas lacrymans*, *P. pisi*, *P. andropogoni*, *P. medicaginis* var. [f. sp.] *phaseolicola*, and *Erwinia phytophthora* were treated with phytoncides extracted from different parts of *Juglans regia* as follows: water-alcohol extracts from (*a*) the wood, bark, inflorescences, and buds before unfolding; (*b*) buds of the upper, middle, and lower strata of the crown; and (*c*) leaves from similar positions and on different sides. Their effect varied according to the physiological condition of the tree and ambient conditions. Bark extracts taken from 1-yr. shoots in spring before bud opening exerted a stronger inhibitory influence than those from the wood, the max. bacteriostatic effect deriving from extracts from buds and leaves on the north side of the upper part of the crown. Only *C. michiganense* was completely inhibited. Water-alcohol extracts from the leaves were still antibacterial after 6 months' storage.

Klement (Z.) & Lovas (B.). **A Xanthomonas phaseoli var. fuscans fágjának biológiai és morfológiai jellemzése.** [Biological and morphological characterization of the phage for *X. p.* var. *fuscans*.]—*Növénytermelés*, **8**, 1, pp. 61–72, 6 fig., 3 graphs, 1959. [Russian and English summaries.]

At the Research Institute for Plant Protection, Budapest, the bacteriophage (Pf. P_1) for *X. p.* var. *fuscans* [**36**, p. 744], isolated from naturally infected bean [*Phaseolus vulgaris*] seeds, formed on broth agar plates transparent, circular plaques 5–6 mm. diam. with well-defined margins. Infectivity was lost after 10 min. at 64° C.; 84% of the particles were adsorbed in 5 min.; the latent period was 50 min.; and burst period 50–80 min., with an av. burst size of 20–24.

The phage belongs to the sperm-like group, the head a sphere 720 A diam., the tail 2,000 A × 250 A. Many disk-like lysis products of 700–950 A were found in the preparations.

Terekhova (Mme N. A.). Влияние метаболитов и антиметаболитов на опухоли растений. [The influence of metabolites and antimetabolites on plant tumours.]—*Bull. Acad. Sci. U.S.S.R.*, Ser. biol., *1959*, 3, pp. 431–437, 6 fig., 1 graph, 1959. [English summary.]

At the Institute of Microbiology, U.S.S.R. Academy of Sciences, Moscow, several compounds were tested on the surface of [unspecified] plant stumps soon after inoculation with *Bacterium* [*Agrobacterium*] *tumefaciens* [cf. **37**, p. 445] and the results assayed by means of a special quantitative method. The rate of tumour formation was greatly inhibited by 1% β-indole acetic acid and appreciably by 2,4-dinitrophenol, both in lanolin paste, though in not less than 48 hr. Complete

inhibition of tumour formation was obtained within 10 days with aqueous solutions of metapterine, 2,6-diaminopurine, and 5,6-dimethyl-benzimidazole. The reversal of the inhibitory effect of metapterine was attempted by means of its chemical analogue (folic acid). These compounds, though greatly inhibiting tumour formation when used individually, are ineffective when mixed together.

HAMMARLUND (L.). **Afprøvning af plantebeskyttelsesmidler 1958.** [Testing of plant protectives 1958.]—*Tidsskr. Planteavl*, **63**, 2, pp. 185–195, 3 fig., 1959. [English summary.]

In this official report from Denmark [cf. **37**, p. 446] are presented the results of experiments to determine the comparative efficiency of mono- and polyphenyl mercury acetate (containing 10% poly- compounds) in the control of stripe disease of barley [*Helminthosporium gramineum*] and wheat bunt [*Tilletia caries*]. A 3–4 times stronger conc. of the latter must be used to produce a comparable fungicidal effect. An even greater difference was noted in phytotoxicity, a 10 times higher conc. of the poly- compound being required to equal the mono- in the inhibition of germination.

A German tin compound [cf. **38**, p. 457] proved highly effective against potato blight [*Phytophthora infestans*]. Infection was exceptionally severe; 2 applications kept the tops healthy for only 2–4 days longer than the untreated, and a further 1 or 2 are recommended under such conditions.

Apple scab [*Venturia inaequalis*] also caused unusually heavy damage. Captan, combinations of thiram and S, and maneb gave good control, but fruit sprayed with maneb did not keep well. Dichlone caused fruit drop and severe russeting of Cox's Orange and Golden Delicious.

Weekly applications of 0·05% karathane was significantly more effective against apple mildew [*Podosphaera leucotricha*: cf. **38**, p. 607] than 0·1% fortnightly.

New pesticides for 1959. Parts 1, 2, & 3.—*Agric. Chemic.*, **13**, 12, pp. 34–36, 110, 119, 1958; **14**, 1, pp. 28–30, 114; 2, pp. 40–41, 121, 123, 1959.

Most of the preparations described in these articles have been noticed, but in the 1st mention may be made of an anti-smog protectant ozoban (Chas. Pfizer and Co., Inc., California), a mixture of 68% ascorbic acid and 26·5% anhydrous inert ingredients, which yields potassium ascorbate in solution; it is used at 2 lb./100 gal. but amounts/acre vary with the type and age of the crop. Inverton 245 (Dow Chemical Co., Midland, Michigan), described in the same article, is an invert emulsion containing 2,4,5-T, designed to reduce spray drifting. Glyoxide dry fungicide (Corona Chemical Division, Pittsburgh Plate Glass Co., Pittsburgh, Pa), noted in the 3rd article, is a wettable powder (75% active ingredient), developed for control of fruit diseases, such as apple scab [*Venturia inaequalis*] and cherry leaf spot [*Higginsia hiemalis*], and also useful against mites on apples.

A new bactericide-fungicide, nabac-25.—*Agric. Chemic.*, **14**, 6, pp. 53, 129–130, 1959.

This compound was developed by the Nationwide Chemical Co., Fort Myers, Florida, specifically for the control of bacterial diseases of peppers [*Capsicum* spp.] and tomato. In tests the av. number of bacterial spots [*Xanthomonas vesicatoria*: cf. **37**, p. 620] on capsicum treated with nabac 25 at $\frac{3}{4}$ lb.[/100 gal.] was 2·2/plant, compared with 3·8 for nabac 25 ($1\frac{1}{4}$ lb.)+zineb, and 6·3 for agrimycin 500 [loc. cit.]. It has proved effective also in the control of downy mildew of cucumber [*Pseudoperonospora cubensis*: cf. **37**, p. 700], and at $\frac{1}{2}$ lb.+zineb (1 lb.) gave a yield of 612 bu[sh.]/acre and numbers with 'belly-rot' 640/acre, compared with 445 and 3,712, respectively, for zineb (2 lb.) alone. In another test, in which it was used alone at 1 or 2 lb., both rates gave markedly better control of powdery mildew of cucum-

ber [*Erysiphe cichoracearum*: cf. **36**, p. 632] than did zineb when 6 treatments were given in May and data recorded on 2 June.

Favourable results are also reported against [unspecified] damping-off in snap beans [*Phaseolus vulgaris*], lima beans [*P. lunatus*], tomatoes, capsicums, cucumbers, cabbage, and watermelon, and brown rot [*Sclerotinia fructicola*] of cherries and peaches.

Bartlett (G. W.). **Gain and loss of resistance in the fungus Penicillium roqueforti Thom.**—*Proc. roy. Soc.*, Ser. B., **150**, 938, pp. 120–130, 1959.

Gradually and with no evidence of mutation, *P. roquefortii* acquires resistance to high concs. of phenyl mercuric acetate (PMA) [**37**, p. 610], proflavine, brilliant green, and sodium azide. It rapidly returns to the sensitive state when grown in drug-free medium. The loss of resistance to PMA occurred more or less simultaneously in all spores of a small population, but to other drugs seemed to occur simultaneously in at least a high proportion of spores. Subculturing a number of times on high concs. of PMA caused strains to retain resistance longer. Loss of resistance to proflavine was not complete, but dropped slowly to a new intermediate level above the threshold for sensitive strains. Strains with acquired resistance to sodium azide eventually returned to the sensitive state, as with bacteria and yeasts. The low stability of resistance would, according to a mutation theory, demand a mutation rate seemingly improbably high.

Schedule for Plants coming into East African Territories.—Issued by the E. African Standing Technical Committee on Plant Import and Export, P.O. Box 21, Kikuyu, Kenya, [1959].

This revised schedule is in the form of a series of $8 \times 4\frac{1}{4}$ in. mimeographed cards, which after a few introductory cards on general procedures are mostly arranged alphabetically under the common names of the host plants (white cards) and cross-indexed under the scientific names by (blue) index cards. The world distribution of some of the pests and pathogens mentioned in the schedule are indicated on yellow and pink cards, respectively.

Rawald (W.). **Die physiologische und ökologische Bedeutung der Mycorrhiza.** [The physiological and ecological significance of mycorrhiza.]—*Z. Pilzk.*, **24**, 1, pp. 1–9, 1958.

In this general review of present knowledge of mycorrhiza consideration is given to the benefits derived by the host and by the fungus, the physiological significance of the relationship, and mycorrhiza as an ecological factor.

Agarwal (G. P.). **Effect of trace elements on the growth and sporulation of three pathogenic fungi.**—*Phyton*, **12**, 2, pp. 87–91, 1959.

In further work at the Dept of Botany, Mahakoshal Mahavidyalaya, Jubbulpore, India [**38**, p. 367], Zn, Mn, Cu, and Fe in a glucose-nitrate medium increased growth and sporulation of *Curvularia penniseti* and 2 strains of *Fusarium caeruleum* [**37**, p. 388], the max. effect occurring when all 4 elements were added together.

Ban (R. W.). **The biosynthesis of ergothioneine.**—*Diss. Abstr.*, **19**, 10, p. 2448, 1959.

At the University of Southern California *Claviceps purpurea* was grown under controlled conditions in submerged culture on a medium of defined composition. Ergothioneine was extracted from the fungus [cf. **35**, p. 364] but not from the medium. From the various data obtained it is concluded that ergothioneine arises from histidine, methionine, and cysteine, probably through the intermediate S-alanyl ergothioneine.

Bereznegovskaya (Mme L. N.). Гликолиз растений в паталогии. [The glycolysis of plants in pathology.]—*J. gen. Biol., Moscow*, **20**, 1, pp. 50–55, 1959. [English summary. 40 ref.]

Following a general review of the subject, the author reports experiments at the Tomsk Medical Institute which indicate that in parasitized plants there is a considerable disruption of carbohydrate metabolism, with a general stimulation of glycolysis activated by co-enzymes. The changes are associated with transference of P radicals and assimilation of P ions.

Waksman (S. A.). **Antibiotics of Actinomycetes, an introduction and an outlook.** —*Antibiot. Ann., 1958–9*, pp. 22–30, 1959. [28 ref.]

This paper deals with the historical background, screening programme, the isolation of actinomycin (the 1st antibiotic from actinomycetes), isolation of the chemotherapeutic agents chloramphenicol and tetracyclines, antifungal, antiviral, and antineoplastic agents. Outstanding problems in the field of antibiotics are outlined.

Herold (M.), Hoffman (J.), Čapková (Mme J.), & Nečásek (J.). **Suppression of growth of fungal microflora in the conservation of meat by chlortetracycline.**—*Antibiot. Ann., 1958–9*, pp. 935–937, 3 diag., 1959.

At the Antibiotics Research Institute, Roztoky, Czechoslovakia, the complex of chlortetracycline with benzalkonium chloride was more active against bacteria from the surface of uneviscerated chickens than chlortetracycline hydrochloride, and it also inhibited [unspecified] yeasts isolated from the same source. With fungicidin the complex was more active against bacteria and yeasts than chlortetracycline hydrochloride. Addition of a small amount of ethanol increased the activity of the chlortetracycline and benzalkonium chloride complex and of fungicidin against yeasts.

Frank (Eleanora), Pansy (F. E.), & Pagano (J. F.). **Nystatin in the control of fungal infections of Orchids.**—*Antibiot. Ann., 1958–9*, pp. 898–902, 1959. [10 ref.]

At the Squibb Institute for Medical Research, New Brunswick, New Jersey, nystatin was successfully used in the control of fungal spoilage of *Cattleya* orchids by direct application to flowers (at approx. 2 ml. of a 300 units/ml. suspension per flower). A high *in vitro* activity of nystatin against phytopathogenic fungi [which are tabulated] suggests a broad application of this antifungal agent against plant diseases.

Pridham (T. G.), Sharpe (E. S.), & Kemp (Carolyn E.). **Antibiotics against plant disease. VI. An agar diffusion method for determining the effects of chemicals on germination of Bean-rust uredospores.**—*Antibiot. Ann., 1958–9*, pp. 914–919, 3 fig., 1959.

In further work [cf. **38**, p. 64] fresh uredospores of *Uromyces phaseoli typica* [*U. appendiculatus*] in a gelatin capsule were fired from a carbon dioxide target pistol modified with a cross-wire at the muzzle onto the medium (10% V–8 juice (V/V)+ 2% Difco Noble agar in tap water, and test materials on the surface) and incubated in the dark in a moist atmosphere for 16–18 hr. at 20±1° C. A white network of germ tubes, simulating aerial growth of saprophytic fungi on solid substrata, was obtained, stimulation or inhibition zones showing in places where effective chemicals had been applied directly in saturated paper disks, in small glass cylinders, or in paper chromatogram strips. The inconsistent germination responses of the spores during the tests is attributed to the season and manner of collection and storage of spores or to self-inhibitory substances produced by the spores.

Crosier (W. F.). **Antibiotics as seed treatments for control of grain smuts.**—*Plant Dis. Reptr*, **43**, 6, pp. 616–618, 1959.

At New York State Agricultural Experiment Station, Cornell University, Geneva, actidione [cf. **37**, p. 639] and 3 of its derivatives, agrimycin, and griseofulvin were compared with ceresan M. Only ceresan M controlled head smut (*Ustilago bullata*) on field brome grass [*Bromus arvensis*]. Actidione and its derivatives (acetate, semicarbazone, and oxine) at 2, 1, and 0·5 oz./bush. reduced the incidence of oat smuts (*U. avenae* and *U. kolleri* [*U. hordei*]) and nearly eliminated *Tilletia tritici* [*T. caries*] on wheat. Agrimycin and griseofulvin gave slight control. In germination tests actidione acetate and semicarbazone (2 oz./bush.) were phytotoxic to brome grass and Yorkwin wheat. Actidione failed to control seed decay of flax or seedling blight (*Helminthosporium sativum* [*Cochliobolus sativus*]) of wheat.

Bel'tyukova (Mme K. I.) & Kulikovskaya (Mme M. D.). Аренарин як засіб боротьби з бактеріальним раком та іншими хворобами Помідорів і як фактор підвищення їх продуктивності. [Arenarin as a substance for the control of bacterial canker and other diseases of Tomatoes and as a factor for increasing their productivity.]—*J. Microbiol., Kiev*, **21**, 3, pp. 13–24, 1959. [Ukrainian with Russian summary.]

The antibacterial action of arenarin [cf. **38**, p. 574], obtained from *Helichrysum arenarium* in 1953, was tested on 45 strains of different causal agents of plant bacterioses at the Institute of Microbiology, Ukrainian Academy of Sciences. Most susceptible were members of the genus *Corynebacterium*, especially *C. michiganense* [**38**, p. 628]. Under the influence of some arenarin series the growth of *C. michiganense* was inhibited at 1/500,000–1/1 million. A practical method was elaborated first for tomato seed treatment and subsequently for plant spraying. Its effectiveness for seed treatment was studied over a 5-yr. period at the Institute's experimental base at Feofaniya and at various other places in the Ukraine, Kazakh, and Georgia. Seed germination was increased 1·5–2 times, the shoots emerged 2–4 days earlier, and plants flowered 3–4 days earlier. According to the var., the number of young fruits was also increased by 11–47% and fruit maturation accelerated. Increased yield from treated seed was 10–42·5% in the Ukraine, 38·4% in Georgia, and 12·8% in Kazakh, S.S.R. Field observations in different areas confirmed that reduction of bacterial and other diseases in mature plants can be obtained by seed treatment with arenarin. Thus at the Kherson varietal selection station infection by *C. michiganense* in the var. 'Mayak' was 0, compared with 0·75% from untreated seed. At State farm no. 500 (Kazakh) the comparable figures for Gruntovÿĭ hrÿbovs'kÿĭ were 0 and 4%. The percentage of other diseases was also reduced almost 3 times. Arenarin seed treatment also gave good results in reducing the number of fruits with symptoms of unspecified virus diseases. Comparative tests of arenarin and granosan for tomato seed treatment showed the superiority of the former from every point of view.

Rotmistrov (M. N.). **A method of studying the microflora in the rhizosphere of a growing plant.** –*Microbiology, Moscow*, **26**, 5, pp. 581–585, 1957. [*Biol. Abstr.*, **33** (A), 9, p. 2624, 1959.]

This method [cf. **38**, p. 131] is for use under field conditions at different depths without disturbing the soil or the plant during growth. Natural silk, invulnerable to soil micro-organisms and chemically inert, is used for extracting the organisms [cf. **38**, p. 576].

Lupinovich (I. S.) & Golub (T. F.). Торфяно-болотные почвы БССР и их плодородие. [Peat-bog soils of the White Russian S.S.R. and their fertility.]

—315 pp., 23 fig., Minsk, Academy of Sciences, White Russian S.S.R., 1958. Roubles 12.50. [12 pp. ref.]

This monograph presents the results of further studies of various types of peat-bog soils in the area and the changes they undergo under cultivation. There are various references to fungi and actinomycetes. A chapter (pp. 198–229) is devoted to the root system of agricultural plants in peat-bog soils and its influence on the development of microflora, and there is also a detailed section (pp. 230–247) on the biological activity of swamp and peat-bog soils.

Lachmann (A.). **Micromycètes parasites reconnus en Bourbonnais.** [Parasitic micro-fungi identified in Bourbonnais.]—*Mém. Soc. bot. Fr., 1958*, pp. 63-74, 1959.

This is a preliminary list of fungi of all groups with hosts, localities, and dates of collection.

Zeĭnalova (Mme V. M.). Материалы по изучению ржавчинных грибов на злаках Азербайджана. [Materials for the study of rust fungi on the grasses of Azerbaijan.]—Труд. Ин-та Земледелия АН Азерб. ССР [*Trud. In-ta Zemled. AN Azerb.S.S.R.*], *1958*, 4, pp. 45–47, 1958. [Abs. in *Referat. Zh. Biol., 1959*, 12, p. 120, 1959.]

This list contains 56 rusts on 221 host plants (fodders, cereals, and wild grasses), 46 belonging to *Puccinia* and 6 to *Uromyces*. *U. koeleria* and *P. mediterranea* were found for the first time in the U.S.S.R. It was established that the largest no. of spp. was found in the low-lying areas, numbers decreasing with increased altitudes.

Воновук (І. V.). Аналіз флори іржастих грибів західних областей УРСР. [Analysis of the rust fungus flora of the western regions of the Ukrainian S.S.R.]—Допов. Повідом., Львівськ. Ун-т. [*Dopov. Povidom., L'vov Univ.*], **7**, 3, pp. 36–39, 1957.

Collections over a decade totalled 289 spp. of Uredinales on 362 spp. (47 families) of vascular plants. A list is given of 17 spp. not mentioned for the U.S.S.R. in Tranzschel's monograph [**19**, p. 167] and those not previously noted for the Ukraine, also new host records (33) for the U.S.S.R. *Puccinia menthae* was found on a new host, *Hyssopus officinalis*, in the Botanical Gardens of the Ivan Franko L'vov State University. From 1951 *Puccinia glumarum* [**36**, pp. 580, 592], previously comparatively rare in the western Ukraine and then occurring mainly on wild grasses and on isolated winter crops in the autumn, began to develop intensively on wheat. *P. maydis* occurs everywhere in the area and causes significant damage to maize in the Transcarpathian region, where the parasite *Darluca filum* is frequently present on the uredo- and teleutosori, infection reaching 10–20%. *D. filum* has also been identified in the sori of *Puccinia triticina* in the neighbourhood of L'vov.

Armstrong (J[oanne] K.) & Armstrong (G. M.). **Physalis alkekengi L., a new host for the U.S. Cotton-, Cassia-, and Sweetpotato-wilt fusaria.**—*Plant Dis. Reptr*, **43**, 4, pp. 509–510, 1959.

In a search at S. Carolina Agricultural Experiment Station for another host of the strain of *Fusarium oxysporum* causing potato wilt *P. alkekengi*, though not susceptible to this pathogen, proved susceptible to U.S. races 1 and 2 of the cotton wilt *F.* [*F. vasinfectum*: cf. **37**, p. 459], to race 2, (but only slightly to race 1) of the sweet potato wilt *F.* [*F. bulbigenum* var. *batatas*: cf. **38**, p. 421], and to *F.* sp. causing a wilt of *Cassia*. It was not infected by a number of other *Fusarium* strains causing wilt of various hosts.

Barmenkov (A. S.). О длительном хранении микрокультур. [On prolonged storage of cultures of micro-organisms.]—*Microbiology, Moscow*, **28**, 3, pp. 444–446, 1 fig., 1959. [English summary.]

For prolonged storage of micro-organisms at the S. Ordzhonikidze All-Union Scientific Chemico-pharmaceutical Research Institute, Moscow, under room conditions to ensure the stability of their physiological characters, a glass desiccator vial is used, in the form of a vessel narrowed in the middle. The expanded lower part (height 2 cm., diam. 1 cm.) is connected with the apical reservoir by a tube (length 5–6 cm., diam. 0·6–0·7 cm.). In the reservoir (length 5–6 cm., cross-section 1·5 cm.) is placed a test tube (3–3·5 cm. × 1 cm.), containing a moisture absorbing chemical, raised to permit free circulation of air in the system. The spore material is prepared on agar. Garden soil mixed with sand (3 : 1) is sterilized at 1·5 atm. for 1 hr., dried to constant wt. under sterile conditions, placed in the vial, the spore material introduced dry, and the lower part of the vial bunged with cotton wool. The tube of desiccant is inserted and the top of the vial plugged. For the prolonged storage of fungal and actinomycete cultures millet is used as a substratum. No significant changes occurred in 4 yr.

Yarwood (C. E.). **Evolution of viruses in roots.**—*Plant Dis. Reptr*, **43**, 6, pp. 638–639, 1959.

On the hypothesis that lack of injury of host by pathogen indicates long association of the two, the suggestion is made that some plant viruses may have been evolved in the roots of their hosts, and tobacco necrosis virus [**38**, p. 469] is put forward as an example. This virus generally remains confined to the roots and does not become systemic. If some viruses have evolved from root parasites, they probably originated in the soil. A 2nd hypothesis, the origin of plant viruses from insect viruses, might apply to a group of viruses distinct from those evolving in roots.

Flores (E.) & Silberschmidt (K.). **Relations between insect and host plant in transmission experiments with infectious chlorosis of Malvaceae.**—*Ann. Acad. bras. Sci.*, **30**, 4, pp. 535–560, 5 pl. (13 fig.), 1958. [Portuguese summary.]

In this further contribution [cf. **37**, p. 218] from the Instituto Biológico, São Paulo, the author records transmission of the virus of infectious chlorosis of Malvaceae [Abutilon variegation virus] to 6 spp. of Malvaceae not previously recorded as susceptible, and to 4 Solanaceous hosts.

Tobacco was infected by grafting and, with some difficulty, by use of viruliferous white flies (*Bemisia tabaci*), infected *Sida micrantha* being a suitable source plant. Symptoms were mild, consisting of a slight chlorotic mottling of the young leaves: the leaf blade between the secondary veins exhibited irregular, somewhat rounded, diffuse chlorotic spots, while the tissue closer to the veins remained green, giving rise to a veinbanding effect, not very pronounced at the leaf border. The leaves were slightly cupped.

The virus was transmitted to tomato by grafting with apical leaves of infected potato seedlings. Transmission by *B. tabaci* from *S. rhombifolia* presented no difficulty. Symptoms consisted principally of angular chlorotic spots extending in bands along the secondary veins, and sometimes in a marked enlargement and clearing of the veins.

Datura stramonium was infected both by grafting and by *B. tabaci*, the latter being surprisingly successful [cf. **35**, p. 185]. Diffuse round or irregular chlorotic spots developed, which were easily masked at low temp. It was difficult to transmit the virus from *D. stramonium* to *S. rhombifolia*, though a few transmissions were obtained.

Cyphomandra betacea was similarly infected by grafting, and sporadically by

white flies, which retransmitted from *C. betacea* to *S. rhombifolia* only occasionally. Angular chlorotic spots developed on the blades and there was pronounced malformation of the leaves.

Jensen (D. D.). **A plant virus lethal to its insect vector.**—*Virology*, **8**, 2, pp. 164–175, 2 graphs, 1959.

Further data from the Dept of Entomology and Parasitology, University of California, Berkeley, confirm an earlier report [**38**, p. 16] of the lethality of the peach yellow leaf roll str. of peach western X virus for the leafhopper *Colladonus montanus*. Of 15 specimens caged on infected celery for 21 days, 12 which transmitted the virus had a mean longevity of 38 days, compared with 82 days for non-infected controls. These results indicate that the virus shortens the life of leafhoppers, and that differences in longevity cannot be accounted for on the basis of altered physiology in the diseased plants. This appears to be the 1st record for a virus that eventually kills its insect vector, and it is held to lend plausibility to the theory that plant viruses may have evolved from arthropod viruses.

Protsenko (A. E.). О взаимоотношении вирусов столбура Томатов **(Leptomotropus solani Ryzkov)** и желтухи Астр **(Leptomotropus callistephi Ryzkov).** [The relationship between the viruses of Tomato stolbur (*L. solani*) and Aster yellows (*L. callistephi*).]—Воп. Вирусол. [*Vop. Virusol.*], **3**, 5, pp. 292–296, 3 fig., 1958. [English summary.]

At the Institute of Microbiology, Academy of Sciences, Moscow, aster yellows virus [cf. **36**, p. 345] was transmitted from cineraria, naturally infected in the seed bed, to petunia and from petunia to tobacco by means of the dodder (*Cuscuta europea*), and from infected tobacco by inoculation to tomato, which developed infection differing from stolbur. The symptoms were deformation and greening of the corolla, while the calyx hardly changed, and chlorosis of the leaves with slight deformation and a tendency to roll. For purposes of comparison tomato plants were also inoculated with tomato stolbur virus [cf. **38**, pp. 135, 227] obtained from the Crimea. They showed a ready response to inoculation. Symptoms were deformation and growing together of the sepals, considerable enlargement of the calyx, and leaves chlorotic and turned upwards. The differences between aster yellows and stolbur symptoms obtained in these experiments, coupled with the data from the literature on the geographical distribution of the 2 viruses, show that they are to be regarded as different. An attempt to transmit stolbur to petunia failed.

Beskina (Mme S. R.). Накопление вируса мозаики Табака в культуре изолированных корешков Помидоров. [The accumulation of Tobacco mosaic virus in a culture of excised radicles of Tomato.]—Воп. Вирусол. [*Vop. Virusol.*], **3**, 5, pp. 304–305, 1 fig., 1958.

In experiments undertaken at the D.I. Ivanovskiĭ Institute of Virology, Academy of Medical Sciences, Moscow, for the purpose of infecting healthy tomato radicles, cultured on a sterile nutrient medium, with tobacco mosaic virus [cf. **14**, p. 127], the virus was introduced into the nutrient medium, directly into the root, and into the cotyledon. The titre of virus in the radicles was determined on 10 half-leaves of *Nicotiana glutinosa* by 4–5 passages after infection. Positive results were obtained only with inoculation to the cotyledon, which resulted in accumulation of the virus in the radicles. Regeneration of the cotyledon occurred, when retained in the nutrient solution, roots growing immediately from it. The growth of tobacco mosaic virus in a culture of isolated radicles should promote the solution of very important problems connected with the elucidation of the physiology of the virus in entirely new conditions.

Broadbent (L.). **The spread and control of plant viruses.**—*Sci. Hort.*, **13** (*1957–58*), pp. 74–79, 1958.

In this general survey [**38**, p. 329] the topics discussed are the sources of virus infection and means of spread, persistent and non-persistent viruses in the light of dissemination by insects, factors affecting spread by insects, and control measures including cultural practices, vector control, and therapy.

Tollenaar (D.). **Increased Cocoa production by foliar copper applications as an effect additional to witches' broom disease control.**—*Trop. Agriculture, Trin.*, **36**, 3, pp. 177–188, 5 fig., 1959.

In Ecuador the crop occurring after the wet season (Jan.–June) is often 80% affected in May–Sept. by witches' broom [*Marasmius perniciosus*: **37**, p. 220], even with cutting out of brooms. Mist-blown dithane was ineffective, but similar applications (200 l./ha. (17·6 gal./acre)) of 2% copper Sandoz (monthly or twice-monthly from July 1956 on 5–6 yr. old ICS 1 trees) considerably reduced the number of affected pods and vegetative brooms in 1957, the twice-monthly treatment reducing infected pods to 13% of the amount on untreated trees [cf. **34**, p. 775].

In an old, heavily infected plantation of 40-ft. trees, where brooms had never been removed, monthly mist-blowing of the canopy with a high-reaching Kiekens machine (2·5% Cu-Sandoz, 13 gal./acre), started in Nov. and continued for 4 or 8 months, increased production to 368 and 420 quintals dry cacao/200 acres, respectively, compared with 232 in the untreated.

The latter part of the paper presents data to show the beneficial effects of Cu spraying on foliage and on crop production and notes that whereas high-vol. spraying is injurious to fruit setting (a physical effect, produced also by water alone) low-vol. spraying supplies the tonic effect of Cu without damage and benefits fruit production by increasing both fruit-set and non-parasitic cherelle wilt. The addition of Zn (0·5 kg./ha.) may also be beneficial [**37**, p. 652], and also 10–40% biuret-free urea occasionally.

Watson (Marion A.). **Cereal virus diseases in Britain.**—*N.A.A.S. quart. Rev.*, **10**, 43, pp. 93–102, 3 pl. (opp. p. 114), 1 graph, 1959. [14 ref.]

This is an up-to-date summary of information on 4 viruses which have appeared in the last 4 yr. Cereal [barley] yellow dwarf virus symptoms were plentiful in the 1957 cereal crop in Great Britain [**38**, p. 650]. At least 2 specimens (from N. Wales and Kent) yielded a much more virulent virus than that collected at Rothamsted. During winter 1957–58 many crops, particularly oats in the S. of England, became severely infected, with serious effects on yield. From the results of small-scale field experiments at Rothamsted 1955–57 with *Rhopalosiphum padi* [**35**, p. 868] (the most effective vector, 60% infection with the less virulent virus and 80% with the more virulent) it was not possible to distinguish the critical times for infection, but in 1958 earliest infection (2 May) was the most harmful. The host ranges, 62 spp. of 14 genera of Gramineae were tested in Great Britain and America, appear to be similar; species of Agrostidae, Hordeae, Phalaridae, and Festuceae are susceptible. The only definitely immune spp. found were *Agropyron repens*, *Arrhenatherum elatius*, and *Agrostis tenuis*. Cross-inoculation experiments indicated that the 2 types of virus are not strains of one virus, but different viruses with similar properties.

Three races of *Delphacodes pellucida* regularly transmit wheat striate mosaic [**38**, p. 315] to 90–100, 40–50, and 10–20%, respectively, of the plants tested. There is indirect evidence that the least efficient race may be in the majority in the field. It is very doubtful whether *D. pellucida* adults could survive even a mild winter, though eggs laid in the leaf sheaths of hedgerow and meadow grasses probably do. How many of these grasses are susceptible is uncertain, *Lolium* spp. alone being

definitely known. In Spain, however, these vectors are presumed to survive, which explains the appearance of the virus in large patches there in contrast to Great Britain where it appears only on isolated plants.

Ryegrass mosaic [**38**, p. 650] was found to be sap-transmissible, but not by aphids or leafhoppers. The virus has a wide host range among the Gramineae, but no dicotyledonous hosts; oats and rice are susceptible, but not wheat, barley, or maize; *Dactylis glomerata* is susceptible. Inoculated ryegrass [*Lolium*] pot seedlings in the glasshouse lost 30–40% of their yield compared with healthy plants. Plants infected in the glasshouse and grown outside sometimes form rather poor tussocks, but vary in their appearance.

Barley stripe mosaic virus has been isolated once only in Great Britain, from Gloire du Velay barley seed imported from France [**37**, p. 631; **38**, p. 9]; its presence was suspected in var. 'Olli' from Canada, but not confirmed. According to the barley var., the symptoms vary from a mild chlorotic mottle to a severe necrotic streak. In very susceptible hosts a chlorotic streak bordered by a narrow region of bronze necrosis is the characteristic symptom. In tests of 20 barley vars. selections H.B. 117/23/2 and H.B. 169/5/22/6 from the Plant Breeding Institute, Cambridge, were the least tolerant (100% infected with severe necrotic symptoms); Rika, Spratt Archer, Plumage Archer, and Maythorp were most tolerant (mild symptoms on 10% of the plants). Of other vars. commonly grown in England, Proctor was moderately tolerant and Provost moderately susceptible. Some wheat vars. and *L. multiflorum* were also susceptible. A high proportion of the progeny of susceptible barley vars. is infected. Sugar beet and *Chenopodium amaranticolor* were found to develop chlorotic lesions on inoculated leaves, but did not become systemically infected. The virus was rather stable in extracted sap, infective to a dilution of *circa* 1/2,000, and serologically active.

Stewart (D. M.), Cotter (R. V.), Roberts (B. J.), & Christensen (J. J.). **Physiologic races of Puccinia graminis in the United States in 1958.**—*Plant Dis. Reptr, Suppl.* 258, pp. 189–196, 1 graph, 1959.

In 566 uredial collections of wheat stem rust (*P. graminis* var. *tritici*) [cf. **37**, p. 711] 27 races and subraces were identified among 775 isolates. Race 56 comprised 29%, a slight decrease from the previous yr., race 11 increased to 23%, influenced by the unusually large number of isolates from the Pacific Northwest, race 15 B decreased slightly to 18%, and there was a slight increase of the 17–29 group to 16%. These races, together with 38 (5%), totalled 91% of the isolates. Race 34 was isolated from Selkirk wheat for the 1st time; it was found in the nursery at St. Paul, Minnesota.

Race 7 (combined with 12) of oat stem rust (*P. graminis* var. *avenae*) comprised 54%, race 8 (with 10) 26%, and race 2 (with 5) 14%.

Zadoks (J. C.). **Cereal and grass rusts of the Netherlands.**—*Robigo, 1959*, 8, pp. 1–6, 1959. [Spanish translation.]

General information is presented on the acreage and vars. of cereals and their rusts [cf. **38**, p. 197]. Stripe rust (*Puccinia glumarum*) is the most important on wheat; leaf and stem rusts (*P. triticina* and *P. graminis*) are of less account. On barley *P. glumarum* does little damage and *P. graminis* is very rare; leaf rust (*P. hordei*) may overwinter on grasses such as *Hordeum murinum*. *P. dispersa* is common on rye but rarely severe; *P. graminis* is occasionally found, but does little or no harm. *P. coronata* on oats is annually recurrent, but of no economic importance; it may become epidemic by Sept. on *Lolium perenne*, the main pasture grass.

Overlaet (J.). **Épidémiologie de la rouille noire sur Blé (Puccinia graminis tritici Erikss. et Henn.) et moyens de lutte dans les conditions culturales de Belgique.** [Epidemiology of black rust on Wheat (*P.g. tritici*) and methods of control

under the cultural conditions of Belgium.]—*Agricultura, Louvain*, Sér. 2, **7**, 2, pp. 255–267, 1959. [Flemish, English, and German summaries.]

The results of inoculation experiments begun in 1956 at the Institut Agronomique, Heverlee, demonstrated that *P. graminis* may appear on the wheat crop as long as a month before the normal period (2nd half of July). These observations agree with Ponchet's findings at Versailles [**36**, p. 12]. In view of the absence of an aecidial host and the late development of the rust, it is evidently unable to overwinter in Belgium, and is re-introduced every year by S. and S.E. winds. The damage caused by *P. graminis* depends largely on the date of its appearance. In 1958, for example, when it was first detected on 1 July, infection was relatively severe though unaccompanied by appreciable reductions in yield.

Although most wheat vars. cultivated in Belgium are susceptible, they commonly escape serious injury on account of their precocity combined with the tardy development of the pathogen. Hence control may be effected by systematic breeding for early maturity, especially among spring wheats.

Hassebrauk (K.). **Physiologic races of Wheat stripe and leaf rusts in Germany.**—*Robigo, 1959*, 8, pp. 10–12, 1959. [German and Spanish translations.]

An annotated list from the Institut für Botanik, Brunswick, of 7 races of *Puccinia glumarum* and 18 of *P. triticina* [**38**, p. 505].

Vakili (N.-G.). **A study of mechanisms of variation of pathogenicity in Wheat leaf rust (Puccinia recondita Rob. ex Desm. f.sp. tritici Eriks.).**—*Diss. Abstr.*, **19**, 12, pp. 3103–3104, 1959.

In genetic studies at Purdue University of crosses between physiologic races 104B, 76, 35, 5, and 2 of *P. recondita* [*P. triticina*: **38**, p. 197] the progeny were tested on 14 differential wheats (including 8 standard). Avirulence was more commonly dominant than virulence. In 86 S_1 progenies of race 104B virulence to Brevit, Loros, and Kenya Farmer was conditioned by single dominant factors B, L, and K, respectively, and avirulence to vars. 36, 3369, and 4665 by H_1, Wab, and M_2, respectively; virulence to Malakof was conditioned by M_1, dominant for virulence, and M_2, dominant for avirulence and hypostatic to M_1, while M_2 was complementary to Ca (dominant), which governed avirulence to Carina, and W_1 and W_2 to Webster: H_1 and H_2, responsible for avirulence to Hussar, condition virulence when homozygous recessive. In 4665, M_2 alone was completely dominant for avirulence. The normal red uredospore colour of race 104B is conditioned by a dominant, C (yellow is recessive, c), which is closely linked to virulence to Malakof and avirulence to var. 36. Race 2 is heterozygous for uredospore colour. Ten of the 12 factors conditioning virulence and colour formed 2 linkage groups, M_1, c, H_1, and H_2, the other M_2, ca, 1, W_2, b, and Wab. Segregation of virulence in races 2, 5, 35, 76, and 104B indicated conditioning of virulence to a given var. by different genes in the different races. Cultures from selfed 104B attacked var. 4665 which had so far been resistant to all cultures from nature.

As a method of studying variation in the rust, 2 uredial clones with contrasting characters were heavily inoculated, alone and mixed, onto vars. reciprocally susceptible and resistant to the 2 clones. A total of 156 red, virulent, recombimant type pustules were obtained on 6 vars. susceptible only to the yellow parent (3 X 18); 65 of these were classified into 29 groups according to their reactions on 5 vars.; at least 12 differed sharply in pathogenicity, which indicated possible fusion, crossing-over, segregation, and recombination in the dikaryophase. Eight of the 65 were virulent on the highly resistant var. 3369, though both parents were avirulent. No recombinant pustule combined the yellow colour of 3 X 18 with the virulence to var. 36 of 8 X 55 because of the close linkage between yellow colour and avirulence. The high frequency of recombinant pustules and the many ways in

which they differed from the parental clones exclude mutation as a significant factor in the variation.

Kachalova (Mme Z. P.). Фитопатологическая эффективность некоторых способов предпосевной обработки семян Пшеницы. [Phytopathological effectiveness of some methods of pre-sowing treatment of Wheat seed.]—*Proc. Timiryazev agric. Acad., 1959*, 41, pp. 115–120, 1959.

At the District Station for Plant Protection, Timiryazev Agricultural Academy, Moscow and Kostrom regions, seed of Lutescens 62 and Moskovka (Mos hybrid 48) wheat was vernalized (moistened with 31 l. water/100 kg. grain and kept at 10–12° [C.] for 7 days), dried, and treated with AB, NIUIF 2, or mercuran at 0·5, 1, and 2 kg./ton, respectively. Bacterization [**38**, p. 253] was also carried out. Seed thus treated germinated well and development at all stages was more rapid. Incidence of bunt [*Tilletia caries*: **38**, p. 401] and brown rust [*Puccinia triticina*: **37**, p. 765] was reduced and yield increased by 25·9%.

A hot-air method also increased yield but sometimes retarded germination and led to a substantial increase of bunt. A hot-wet method (100 kg. seed moistened with 33 l. water and kept at 26–28° for 36–48 hr.) followed by fungicide treatment gave complete control of bunt.

Király (Z.) & Lelley (J.). **A Búza túlérzékenységi reakcioja a porüszögfertőzés hatására.** [Hypersensitive reaction of Wheat to loose smut infection.]—*Növénytermelés*, **6**, 3, pp. 233–238, 1 fig., 1957. [Russian and English summaries. Received Sept. 1959.]

In tests at the Plant Protection Research Institute, Budapest, and the Agricultural Institute, Kompolt, Hungary, 2 Hungarian winter wheat vars., Hatvani 37/1 and Mindenes, infected with the 'spring' biotype of *Ustilago tritici* [*U. nuda*], gave a hyperergic reaction which inhibited the disease. The hypothesis that apparently healthy plants have actually recovered after initial infection has been demonstrated by Stelzner's microtechnical method [**14**, p. 746]. In a number of plants exhibiting the hypersensitive reaction hyphae of the pathogen were found in the culms, but they never reached the uppermost node and the head.

Johnson (A. G.). **Further studies of physiologic races in Urocystis tritici.**—*Phytopathology*, **49**, 5, pp. 299–302, 1959.

In the greenhouse at Beltsville [**22**, p. 245; cf. **31**, p. 59] seed of a number of wheat vars. was inoculated with *U. tritici* [*U. agropyri*] from different parts of the world in comparison with U.S. races 1 and 2. The biotype from Chile is race 2; those from Australia and S. Africa are related but distinct and are designated 2A and 2B, respectively; race 3 from Japan and 4 from India are distinct; C1, 2, 4, 8, 9, 11, and 12 from China [cf. **24**, p. 407] resembled U.S. race 1 though differing in some respects, C7 agreed fairly well with U.S.2, C3 and 10 were somewhat similar to it, but C6 was distinct from both U.S. races.

Rapports sur la campagne 1957 de la Société d'Encouragement de la Culture des Orges de Brasserie et des Houblons en France. [Reports of the 1957 campaign of the Society for Promoting the Cultivation of Brewing Barley and Hops in France.]—75 pp., 12 graphs, Issoudun, Laboureur et Cie, [?1958].

In the separate reports of each barley trial there are brief notes on the fungus diseases which occurred and the vars. attacked.

Ellett (C. W.). **Ascochyta hordei on Barley in Ohio.**—*Plant Dis. Reptr*, **43**, 7, p. 835, 1959.

Elsewhere in the U.S.A. this disease has been reported only from W. Virginia and the Far West.

Thomas (M. H.) & Earhart (R. W.). **Growth rates and inoculation methods for a Helminthosporium inciting Oat chlorosis.**—Abs. in *Phytopathology*, **49**, 5, p. 320, 1959.

Max. growth of an *H.* sp. causing oat chlorosis [in S. Carolina: **37**, p. 533] was obtained at 28° C. on potato dextrose and Lima bean agars; growth was faster in light and spore production greater in darkness. Inoculation of Victorgrain 48–93 and Arlington oats in the greenhouse, by artificially infesting seed or soil, was not always successful in the 1st planting, though replanting in the same soil produced typical symptoms, indicating the probable need for a build up of the pathogen in the soil. Spraying the foliage with a spore suspension gave results similar to but not identical with those with *H. victoriae* and *H. sativum* [*Cochliobolus sativus*] and often induced complete necrosis of the leaf blade.

Bogovik (I. V.). Склероспороз Ржи. [Sclerosporosis of Rye.]—Защ. Раст., Москва [*Zashch. Rast., Moscow*], **4**, 3, p. 54, 1959.

Naumov's report of *Sclerospora secalina* [**32**, p. 675] was from the vicinity of Kotlas (Archangel region). In 1958 the author found *S. secalina* on rye at several places near L'vov, Drogobych, and Rovno in the Ukraine.

Pohjakallio (O.) & Salonen (A.). **Kymmenen vuotta kenttäkoetoimintaa Muddusniemen Koetilalla Lapissa.** [Ten years of experiments on Muddusniemi Experimental Farm in Lappland.] –Reprinted from *Maatalous ja Koetoim.*, **12**, pp. 42–54, 4 fig., 1958. [English summary.]

The low-temperature fungi causing damage to winter cereals (especially rye) and grasses, including *Sclerotinia borealis*, *Fusarium* [*Calonectria nivalis*], and *Typhula* spp. [**33**, p. 743], were effectively combated by soil treatment with brassicol.

Grasso (V.). **Il carbone del Mais (Ustilago mays-zeae (DC.) Magnus).** [Maize smut (*U. maydis*).]—*Ital. agric.*, **96**, 1, pp. 49–55, 8 fig., 1959.

An up-to-date summary of essential information on the geographical distribution [map 93], symptoms, life-history, and control (especially by genetic methods).

Beke (F.) & Marton (J.). **A Kukoricaüszög fertőzésének hatása a termés mennyiségére.** [The influence of blister smut of Maize on yield.]—*Mag. Mezog.*, **13**, 18, p. 17, 1958. [Abs. in *Referat. Zh. Biol., 1959*, 11, p. 208, 1959.]

It was established experimentally in Hungary that with seed 5–50% infected by blister smut [*Ustilago maydis*] there is a 1·8–14·5% reduction in yield. If a maize hybrid is planted after the appearance of infection at the time when the plumes are cut, the reduction is doubled.

Pan (S.-F.). Шведская муха и пузырчатая головня на Кукурузе. [Swedish fly and blister smut on Maize.]—Защ. Раст., Москва [*Zashch. Rast., Moscow*], **4**, 2, pp. 25–26, 1 fig., 1959.

In experiments in 1958 at the Dept of Agricultural Entomology, Timiryazev Agricultural Academy, for the purpose of determining the exact connexion between damage by larvae of the Swedish fly [*Oscinella frit*] and blister smut [*Ustilago maydis*: **37**, p. 280], Voronezhskaya 76 maize plots were dusted twice with 12% hexachlorane; others were isolated from fly with gauze until the appearance of 5 leaves; the control was freely damaged by fly. After removal of the gauze all plots were dusted 3 times with blister smut spores. With artificial infection only individual plants of those damaged by *O. frit* become infected by *U. maydis*, while with natural infection none of the plants undamaged by *O. frit* became infected. Thus, in the conditions of the non-chernozem zone the damage caused by *O. frit* plays a decisive role in infection. Almost 100% infection can be obtained by

the injection of a water suspension of chlamydospores into the base of the stalk 2–3 cm. above the soil. This evidently damages the soft tissue of the plant. *O. frit* larvae produce similar results when damaging the leaves of maize, puncturing the tissue and facilitating the penetration of the plant by *U. maydis*. Furthermore, the tissue damaged by the larvae discharges an exudate. Chlamydospores in this exudate at room temp. germinate 78% (±10) after 24 hr., whereas in water only 26·8% (±6) do so. The discharge of an exudate on leaves damaged by *O. frit* can evidently be accepted as one of the conditions contributing to smut infection. Control measures proposed are 2 dustings with 12% hexachlorane (20 kg./ha.). With artificial infection this reduced the percentage of blister smut infection 7–8 times.

Воноvўк (I.V.). Гельмінтоспоріоз Кукурудзи в західних областях УРСР. [Helminthosporiosis of Maize in the western regions of the Ukrainian S.S.R.] —Допов. Повідом., Львівськ. Ун-т. [*Dopov. Povidom., L'vov Univ.*], **7**, 3, pp. 39–42, 1957.

The causal agent of this helminthosporiosis, a new infection of maize during the last 2–3 yr. in this area, differs specifically from *Helminthosporium turcicum* and from *H. zeicola* [**10**, p. 305] in the size of conidiophores (170–206×7·5–11 μ) and conidia (68–160×20–32 μ) and in the no. of conidial cross walls (3–9). Until more detailed data from different areas are available, the species is left undetermined. The disease has been observed in various areas of the L'vov, Tarnopol, Drogobich, Stanislav, and Transcarpathian regions. Often crops suffered 100% damage, especially on individual plots, for example near L'vov, where the maize was very closely planted and weak. Poor soil conditions, stagnant soil water, and waterlogging by rain are frequent factors weakening the plants. On 2 State farms, however, in the Transcarpathian and L'vov regions, where the crop was sown by the square cluster method, well spaced, given attention and kept free from weeds, damage was not significant. Thus, attention to these features and the use of high quality hybrid seed of regional vars. will prevent damage.

Kingsland (G. C.). **Etiology and epiphytology of stalk rot of Corn in Pennsylvania.** —*Diss. Abstr.*, **19**, 11, p. 2728, 1959.

Of the fungi isolated at the Pennsylvania State University from maize seedlings and mature plants, *Fusarium moniliforme* [*Gibberella fujikuroi*: **36**, p. 241; **38**, p. 593] was the most prevalent in 1955, while in the following 2 yr. *F. m.* [*G. f.*] var. *subglutinans* was the most frequent; the former dropped to 2nd in 1956 and was not found in 1957. Isolates of *G. zeae* [**38**, p. 513], few in 1955 and 1956, rose to 33% in 1957. *Diplodia zeae* [*D. maydis*: **37**, p. 717] was not isolated. *G. f.* var. *subglutinans* was obtained from areas adjacent to maize borer [*Pyrausta nubilalis*: cf. **38**, p. 296] galleries during 1957. *G. zeae* was not isolated from seedling tissue or from root tissue in any year. It is suggested that the fungi responsible for stalk rot enter the plant via rudimentary ears, leaf tissue, and crowns.

Although *G. fujikuroi* and its var. *subglutinans* were found associated with maize throughout the growing season, stalk rot symptoms occurred only in the autumn, usually beginning in mid-Sept. The former made more rapid linear growth in culture at 35° C. than did var. *subglutinans* or *G. zeae*, and grew equally well at 25° and 30°, while the opt. for the other 2 was 25°.

When the 3 fungi were introduced into pasteurized soil with 2 hybrids and 2 inbreds only *G. zeae* caused seedling blight. On field inoculation of Pennsylvania hybrid 444 all 3 fungi caused stalk rot; var. *subglutinans* was the least damaging. All 3 caused less rot when inoculated in Sept. than in Aug.

During later stages of infection *G. zeae* was capable of growing intracellularly. It was not observed in the vascular system, but it did cause disintegration of

the ground parenchyma, while *G. fujikuroi* penetrated xylem, phloem, and sclerenchyma as well as parenchyma.

Baker (Doris), Neustadt (M. H.), & Zeleny (L.). **Relationships between fat acidity values and types of damage in grain.**—*Cereal Chem.*, **36**, 3, pp. 309–311, 1959.

The fat acidity test was applied as an index of different types of damage to over 500 samples at the Agricultural Marketing Service, U.S. Dept Agric., Washington, D.C. In general, deterioration in storage from [unspecified] moulds and heating showed a high positive correlation with the fat acidity value and field damage a low one. The rate of increase in fat acidity values produced by different types of damage is expressed by regression coefficients. Positive correlations between fat acidity levels and percentage of damage, e.g. for 'sick' wheat [**38**, p. 203] and blue-eye mould on maize [cf. **38**, p. 141] were 0·847 and 0·827, respectively. Other sources of deterioration included cob rot of maize [?*Diplodia zeae*] and wheat scab or blight [*Gibberella zeae*], with correlation coefficients of 0·982 and 0·65, respectively.

Yoshii (H.). **Plant virus transmission by insects. IV. Metabolic changes in Rice affected with the dwarf disease virus (Oryza virus).**—*Virus (Osaka)*, **8**, pp. 394–405, 1958. [Abs. in *Chem. Abstr.*, **53**, 14, col. 13290i–13291a, 1959.]

The O consumption and respiratory quotient of diseased plants were shown by studies at Ehime University, Osaka, Japan [**32**, p. 506], to exceed those of healthy ones. The activity of the terminal ascorbic acid [vitamin C] oxidase was not affected by the virus. The level of oxidative phosphorylation (P/O ratio) was higher in diseased than in healthy plants. Infected plants contained much less inorganic but substantially more organic and nucleic acid P than healthy ones, the total P content being slightly higher in the former. The virus did not appear to influence the quantity or quality of the nucleoproteins and nucleic acids in the host.

Podhradszky (J.) & Südi (J.). **Rizsfajták 'bruzone rezisztenciájának' szabadföldi elbirálása.** [Field assessment of resistance of Rice varieties to 'bruzone'.]—*Növénytermelés*, **6**, 3, pp. 239–248, 6 fig. (3 col.), 1957. [Russian and English summaries. Received Sept. 1959.]

At the Plant Protection Research Institute, Budapest, Hungary, rice sown in 3 replications, Apr., May, and June, in 1–1·5 m. wide plots of soil rich in N, with strips of the susceptible var. Dunghan Shali between, was sprayed shortly before flowering with a conidial suspension of *Piricularia oryzae* [**37**, p. 161], on an evening promising a night with 8–10 hr. dew. For 1 sq. m. 80–150 ml. of a conidial suspension (containing 50,000–200,000 spores/ml. produced under glass on susceptible barley vars.) in 0·25% gelatin+0·05% Na-oleate was used. If infection took place under wetted gauze tents before flowering the leaves of Dunghan Shali dried up, but if after flowering only slight patches developed on the leaves, infection being dominant in the nodes and tassels. The resistant Precoce Allorio behaved similarly if infected after flowering, but if before, its leaves proved resistant. The authors consider that the appearance of blast normally requires a 2–3 week period of weather favourable to the fungus.

Katsuki (H.). **Studies on the metabolic function of biotin. III. Accumulation of α-keto acids in biotin-deficient culture of Piricularia oryzae.**—*J. Biochem., Tokyo*, **46**, 5, pp. 621–627, 1959. [22 ref.]

Previous contributions to these studies at Kyoto University, Japan, appeared in *J. chem. Soc. Japan*, **76**, p. 941, 1955; **77**, p. 482, 1956. In culture on a biotin-deficient medium *P. oryzae* [**38**, p. 142] accumulates pyruvic, α-ketoglutaric, and dimethyl-pyruvic acids (*J. Amer. chem. Soc.*, **77**, p. 4686, 1955); lacking thiamine, it

accumulates the 2 1st-named only. A remarkable decrease in the adenosine triphosphate and pyridine nucleotide contents occurred in the biotin-deficient mycelia, with a corresponding fall in unstable phosphate compounds.

Mizukami (T.). **On the relationships between Xanthomonas oryzae and the roots of Rice seedlings.**—*Agric. Bull. Saga Univ.* 6, pp. 87–94, 1957. [Japanese with English summary. *Biol. Abstr.*, **33**, 9, p. 2875, 1959.]

Seminal roots of rice seedlings became invaded by *X. oryzae* [**36**, p. 664] when dipped (especially up to stem level) in a bacterial suspension. When a sterilized rice seed was placed on 2-layer agar medium, the lower one inoculated with *X. oryzae* and the upper one sterile, the roots failed to supply enough O or nutrients for bacterial multiplication in the agar but the roots in both layers became thoroughly invaded after contact with the bacterial layer. It is concluded that the roots had an activating effect on the static bacteria in the lower layer.

Johnston (T. H.), Cralley (E. M.), & Henry (S. E.). **Straighthead and Rice varieties in Arkansas.**—*Arkans. Fm Res.*, **8**, 2, p. 2, 1 fig., 1959.

Straighthead [cf. **36**, p. 663] is chiefly found on light to medium-textured soils never before under rice, or not for some years, and often where very heavy vegetation has been turned under. Bluebonnet 50 [**34**, p. 747] was the most resistant long-grain var. (14% sterility in one trial compared with 69% for Sunbonnet, the most susceptible). Drying the field [cf. **38**, p. 367] just before flowering (plants with zenith-Nato type maturity 7–8 weeks old, Bluebonnet 8–9) has given some control.

Daleia (G. G.) & Sinha (S.). **Further studies on biometry of uredospores of Puccinia penniseti Zimm.**—*Proc. Acad. Sci. India*, Sect. B, **27**, 5, pp. 245–250, 1957. [*Biol. Abstr.*, **33**, 10, pp. 3202–3203, 1957.]

Monospore cultures of *P. penniseti* [**37**, p. 658] from 22 localities were established on Agra Local bajra [*Pennisetum typhoides*] at Agra College and acclimatized over 3 generations under stable environmental conditions in a greenhouse. Following the technique of Levine [**7**, p. 432] 100 mature uredospores of the 3rd generation of each sample were measured and width : length ratios calculated. The presence of distinct categories indicates that 3 biologic forms may occur.

Patel (M. H.) & Desai (M. V.). **Use of polythene bags to secure high infection by Tolyposporium penicillariae Bref. in Pennisetum typhoides Stapf. and Hubbard.**—*Curr. Sci.*, **28**, 6, pp. 248–249, 1 fig., 1959.

Studies at the Institute of Agriculture, Anand, India, showed the need for a humidity of $> 90\%$ to ensure high infection. This was obtained more effectively with polythene bags over the inflorescences than with butter paper bags, the former giving almost 100% humidity [cf. **35**, p. 673].

McClean (A. P. D.) & Engelbrecht (A. H. P.). **Xyloporosis, cachexia and abnormal bud-unions in South African Citrus trees.**—*S. Afr. J. agric. Sci.*, **1**, 4, pp. 389–405, 1958. [Afrikaans and French summaries.]

In rootstock experiments at the Citrus and Sub-Tropical Horticultural Research Station, Nelspruit, reported from the Division of Plant Pathology, Pretoria, the behaviour of most scions on stocks of sweet lime was poor; tristeza virus was probably partly responsible, but the extreme dwarfing and unhealthy condition of the trees of some scions, and the type of vascular pits and projections present in the sweet lime stocks suggest that xyloporosis may also occur, especially in Valencia, Washington Navel, Tomango orange, Marsh grapefruit, and Lisbon lemon. Proof that xyloporosis (cachexia) does occur in some scions was obtained by grafting to

seedlings of Orlando and Mineola tangelos, using 6 sources of the virus differing from one another in their reaction on indicator seedlings. After 20 months the test trees were transplanted to the field and 18 months later symptoms similar to those described for cachexia by Childs [**32**, p. 18] were showing in the trees of the 2 series inoculated from lemon sources, the others being normal.

Many vars. of sweet orange on rough lemon stocks in the collection at Nelspruit show an abnormal bud-union similar to the ones described from Florida and Israel [**36**, p. 23]. Though the belief is commonly held in Florida that xyloporosis may be the cause of this, the authors found evidence to suggest that this may not be so. Pickstone Navel sweet orange, which shows bud-union symptoms, has failed to give a xyloporosis reaction in transmission tests to Orlando tangelo seedlings, and the strain of Valencia used in rootstock and other field experiments at Nelspruit makes a normal union with rough lemon, yet its behaviour on sweet lime stocks strongly suggests that the parent tree is infected by xyloporosis.

Bud-union disorders of much the same pattern are described in trees of some scions on trifoliate stocks, including trees from scions of sweet oranges infected by exocortis and those from 2 scions of seedling origin free from exocortis. A bud-union disorder of a Nagami kumquat tree on a Nagami kumquat stock is also recorded.

Yoshii (H.) & Kiso (A.). **Plant virus transmission by insects. III. Comparative observations on metabolic changes in Satsuma Orange and plant hopper affected with the dwarf disease virus of Citrus unshiu.**—*Virus (Osaka)*, **8**, pp. 385–393, 1958. [Abs. in *Chem. Abstr.*, **53**, 14, col. 13290g, 1959.]

The activity of the terminal cytochrome oxidase is considerably reduced in citrus plants infected by dwarf virus [**37**, p. 584], but no comparable change was observed in vectors [*Geisha distinctissima*] fed on diseased material. The marked diminution in the pyruvic, succinic, and citric acids in affected plants impaired the insects' respiration. An increase in ribonucleic and deoxyribonucleic acids occurred in diseased plants but not in the insects feeding thereon. By means of electrophoresis and ultra-violet absorption 2 fractions in the host and 3 in the leafhopper were shown to be nucleoprotein. The 4th fraction associated with plant and insect protein is nucleic acid, the content of which fell with infection in the host but rose in the vector. From these data it is assumed that the lowered metabolism of the leafhopper results from the deficiency of respiratory substrates and decrease of nucleoprotein in the plant.

Rangaswami (G.), Rao (R. R.), & Lakshmanan (A. R.). **Control of Citrus canker by antibiotics.**—*Curr. Sci.*, **28**, 4, p. 167, 1 graph, 1959.

In further field studies at Annamalai University, Madras [cf. **38**, p. 476], streptomycin sulphate (used as before) considerably reduced *Xanthomonas citri* on 48-yr. old limes with severe canker; phytomycin (2,500 p.p.m.) also checked the disease considerably, but thiostrepton (500 p.p.m.) had little effect, nor did Bordeaux (1%), used for comparison.

Kramer (M.). **O emprêgo do ervicidas na campanha de erradicação do 'cancro cítrico'.** [The use of herbicides in the campaign to eradicate Citrus canker.] —*Biológico*, **25**, 5, pp. 91–97, 1 fig., 1959. [English summary.]

Of 3 compounds tested in São Paulo, Brazil, in 1958, only trifenox (2,4,5-T ester), was effectual in killing orange trees infected by canker [*Xanthomonas citri*: **37**, p. 284]. It was applied at a conc. of 2% vol. in diesel oil to new sprouts from the roots or at 4% to those from the trunks.

Harding (P. R.). **Biphenyl-induced variations in Citrus blue mold.**—*Plant Dis. Reptr*, **43**, 6, pp. 649–653, 3 fig., 1959.

Investigation by the U.S. Dept Agric. at Panona, California, of phenomena related

to the storage of lemons with biphenyl paper, showed that on exposure to biphenyl for periods varying from 3 days to 2 weeks or more the growth of normal strains of *Penicillium italicum* [**38**, p. 144] was reduced and they produced dark red, non-sporulating colonies. Some strains were produced, however, that were resistant to very high concs. of biphenyl (obtained by wrapping individual fruits in biphenyl paper or placing them over caked biphenyl, or inverting agar cultures over biphenyl), grew at a normal rate, and formed white mycelium that soon sporulated and became typically glaucous. Other strains proved semi-resistant, with intermediate growth rates and sporulating or white, non-sporulating colonies. The resistant strains arose, after 1–2 weeks or more exposure to biphenyl, as a part of the affected parent colony, which they overgrew. Sometimes the acquired resistance appeared to be genetic, and remained after exposure to an atmosphere lacking biphenyl, but in other strains resistance appeared to be physiological and was lost in the absence of biphenyl.

Neither sodium orthophenylphenate [loc. cit.], used in post harvest washing, nor limonene, used as a deodorant in biphenyl paper, caused the colour variations in *P. italicum*. A high conc. of limonene reduced the effect of biphenyl in retarding growth and preventing sporulation but the 1% used in biphenyl paper made no difference.

Moreau (C.). **Le test Benlloch et ses applications. Méthode commode d'essais fongicides pour la protection des Agrumes.** [The Benlloch test and its uses. A convenient method for testing fungicides for the protection of Citrus fruits.] —*Fruits d'outre mer*, **14**, 5, pp. 211–217, 4 pl., 2 graphs, 1959.

A modification of the original method (*Bol. Pat. veg. Ent. agríc., Madr.*, **20**, pp. 181–192, 1953–4) has been tested at the Muséum National d'Histoire naturelle, Paris. The skin of oranges was cut vertically and horizontally by 4 or 5 parallel lines, 3–4 cm. long and 1 cm. apart, giving a pattern of squares, then they were submerged in various concs. of the fungicides under test, dried, sprayed with a suspension of spores of *Penicillium italicum* or *P. digitatum* [**35**, p. 447], and incubated in pairs at 18–20° C. in glass containers with wet cotton wool, to maintain a high humidity. The degree of rotting that ensued was then assessed on a scale of 1–10 and expressed graphically. For correct interpretation of results all the fruit used must be exactly comparable as regards var., time of harvest, and post-harvest environment.

De Fossard (R. A.). **Brown stem of Oranges investigation.**—*Bull. Min.* (formerly *Dep.*) *Agric. Jamaica*, N.S., 56, 160 pp., 3 pl. (5 fig.), 2 graphs, [?1959].

A comprehensive and fully tabulated account is given of investigations of this condition [cf. **38**, p. 293], known in Jamaica also as 'brown spot' and 'burnt stem', and its possible correlation with factors in the field, packing house, and cold storage. The disorder, considered to be of physiological origin as no pathogen has been found associated, is a rind blemish at the stem end of the fruit. Discrete patches or a roughly circular area may be affected, the rind collapsing and subsequently turning brown. The condition is seldom seen on the tree. It has increased in importance with the expansion of the citrus industry in recent years, especially in the small fruit required for the New Zealand market. It appears more consistently in fruit from wetter than from drier areas, and is most serious after a long dry period in Dec.–Mar. Essential steps in countering it include rigid selection of fruit, reduction of delay in all post-harvest operations, lowering of fruit temp. to 40–45° within 2 days of arrival in cold store, and maintenance there of high humidity. Fruit showing a colour break at harvest should be used as far as possible for export, and then need not be gassed, nor should it be de-buttoned. Use of diphenyl impregnated wrappers to control wastage is also recommended.

Tenth Annual Report of the Research Department of the [Indian] Coffee Board (1956–57).—*Bull. Indian Coff. Bd Res. Dep.* 10, 164 pp., 4 fig., 5 graphs, [?1959].

In the mycology section (pp. 88–104) [cf. **37**, p. 236] K. V. George reports the results of a series of experiments. High-vol. spraying with Bordeaux at 0·5% against *Hemileia vastatrix* has given significantly superior results to lower concs. and has not been bettered by any proprietary fungicide or by low-vol. spraying.

Damping-off caused by *Fusarium* sp. and *Rhizoctonia* sp. killed more seedlings in sterilized than in unsterilized soil. Incidence of brown eyespot (*Cercospora* sp.) was lower in Feb.–Mar., than in Oct.–Nov., when also the differences in susceptibility between the 4 vars. tested are more apparent; the order of decreasing susceptibility seems to be S.795, Kents, S.228, and Coorgs, though the differences are not very wide.

Silva (H. L. E.). **São Tomé e Príncipe e a cultura do Café.** [São Tomé and Príncipe and the cultivation of Coffee.]—xii+504 pp., 104 pl. (10 col.), 16 graphs, 7 maps, Lisbon, Memórias da Junta de Investigações do Ultramar No. 1, Ministério do Ultramar, 1958. $200. [English summary pp. 353–387; 257 ref.]

In this beautifully produced, extensive survey from the Portuguese Ministry for Overseas Territories, a small section (pp. 325–331) is devoted to fungus diseases. The most extensive damage is caused by *Hemileia vastatrix* [**37**, p. 536], which is especially prejudicial to *Coffea arabica* below 600 m. At higher altitudes no important attacks were found from mid-Sept. to the beginning of Dec. In São Tomé *C. liberica* and *C. dewevrei* var. *excelsa* are also susceptible. The fungus was also found on *C. stenophylla* in São Tomé and on *C. canephora* in Príncipe. It is thought that *C. arabica* is an economically viable crop for growing between 300 and 600 m. Control can be obtained with Bordeaux mixture (0·4%) or with preparations such as copper Sandoz, perenox, etc. at 0·2%. The 1st application should be made in Oct.–Nov., the 2nd in Jan.–Feb., and the 3rd in April–May. *H. coffeicola* [loc. cit.] parasitizes mainly *C. arabica*, though it was also found on *C. liberica*. If severe attacks cause leaf fall coffee production might be affected. Root rot due to *Rosellinia* sp., probably *R. aquila*, or possibly *Armillaria mellea*, is present and attacks shade trees also. There is also a berry anthracnosis, presumably caused by *Glomerella cingulata*.

Corbett (D. C. M.). **Fusarium bark diseases of Coffee in Nyasaland.**—*Nyasald Farm. For.*, **4**, 4, pp. 3–7, 1959. [19 ref.]

Three bark diseases of coffee are reported [**38**, p. 656], one which attacks and kills young, green shoots and is caused by *F. lateritium* var. *longum* [cf. **15**, p. 780], a collar rot which girdles the main stem at or slightly above ground level and kills the tree, and is associated with *F. stilboides* (a synonym of *F. l.* var. *longum* [**35**, p. 449]), and scaly bark, also caused by the same fungus. It is concluded that damage occurs only on coffee growing under unfavourable circumstances, such as on soils that are compacted, or too acid, or under excessive shade, undue weed competition, or shortage of water. Alleviation of such factors, removal and burning of prunings, and use of fungicidal paint on pruning wounds are recommended.

Sequeira (L.). **The host range of Mycena citricolor (Berk. & Curt.) Sacc.**—*Turrialba*, **8** (*1958*), 4, pp. 136–147, 5 pl., 1959.

A preliminary host list is given for *M. citricolor*, compiled at the Research Dept, Compania Bananera de Costa Rica, Coto, Costa Rica [**37**, p. 354], comprising about 150 plants in more than 45 families. Crop plant hosts, in addition to coffee, which may suffer severe losses are quinine and cacao. The fungus would appear to be normally present as a forest parasite in Costa Rica, attacking a number of plants

in the wild. *M. citricolor* is the only leaf spot organism known to be luminescent, and use was made of this character in examining suspected lesions which did not bear the characteristic stilboids. Spotted leaves were placed in moist chambers and if luminescence was apparent within 48–72 hr. the leaves were maintained in moist chambers for 2–3 weeks to determine whether stilboids or carpophores of the fungus formed on the lesions.

Sheffield (F[rances] M. L.). **Stem-pitting condition in Coffee.**—*Kenya Coffee*, **24**, 283, pp. 265–266, 2 fig., 1959.

A popular account is given of the disease [cf. **38**, p. 5], which is widespread in Kenya in both old and young trees and under various conditions from 4,000–6,500 ft. Young trees commonly show the symptoms, but otherwise look healthy. No associated organism has yet been found. There is evidence that a tree which has produced abnormal tissue can subsequently resume development of normal tissue.

Muller (L.). **Observación y control de las deficiencias de elementos menores en el Cafeto.** [Observation and control of minor element deficiencies in Coffee.]—*Turrialba*, **8** (*1958*), 4, pp. 126–135, 1959. [80 ref.]

This review from the Departamento de Fitotecnia, Instituto Interamericano de Ciencias Agricolas, Turrialba, Costa Rica, covers the literature on both major and minor element deficiencies (12 elements) in coffee.

Shoji (K.) & Ota (R. M.). **Zinc deficiency of Coffee.**—*Hawaii Fm Sci.*, **6**, 4, p. 3, 1958. [Abs. in *Chem. Abstr.*, **53**, 11, col. 1062f, 1959.]

Zn deficiency in coffee [cf. **38**, p. 206], characterized by interveinal chlorosis of the young foliage, was effectively treated by sprays of 2 lb. $ZnSO_4$, with or without 1 lb. H_3BO_2/100 gal., which resulted in marked recovery within 4–8 weeks. B deficiency was corrected by H_3BO_2 alone but symptoms of Zn shortage remained apparent. Chlorotic leaves and shoots contained much less dry matter than normal ones. $ZnSO_4$ spraying should be repeated at intervals of 3–4 months to prevent recurrence. The addition of 2 lb. lime/100 gal. to fertilizer-grade $ZnSO_4$ is recommended.

Laird (E. F.) & Dickson (R. C.). **Insect transmission of the leaf-crumple virus of Cotton.**—*Phytopathology*, **49**, 6, pp. 324–327, 1959.

Further investigations at the Citrus Experiment Station, Riverside, California, confirmed that this virus [**34**, p. 299] could be transmitted from cotton to cotton (Upland) and also to Egyptian cotton by *Bemisia tabaci* (previously called *B. inconspicua* [loc. cit.]), but not by *Trialeurodes abutilonea*. Immature insects could not acquire the virus (a distinction from cotton leaf curl virus), but it was transmitted by adults both from newly infected plants and infected ratoons. The acquisition threshold was 4–8 hr. and for inoculation feeding 1–2 hr. The virus was retained by the adult for 5 days and was not egg transmitted. Seed transmission could not be demonstrated, nor was mechanical transmission achieved. Transmission occurred only when viruliferous insects fed on the true leaves and not on cotyledons. Virus-vector relationships indicate a resemblance to cotton leaf curl virus, but from published descriptions the symptoms on Egyptian cotton appear to be distinct, though similar.

Bird (L. S.). **Loss measurements caused by the bacterial blight disease of Cotton.**—Abs. in *Phytopathology*, **49**, 5, p. 315, 1959.

Loss of yield [in Texas: **38**, p. 407] in 1952 of cotton inoculated with races 1 and 2 of *Xanthomonas malvacearum* was due to leaf infection only and was 14–32% and 9–34% in 2 tests, the degree of loss being associated with the tolerance of the

cotton strains. In 1 test there was a significant percentage reduction in lint. In 1958 leaf infection by race 1 reduced the yield by 6·4% with a significant loss in weight/100 seed. The percentage reduction in yield due to leaf infection appears to be about half the percentage of leaf drop caused by the disease.

Blackmon (C. W.) & Bird (L. S.). **Nematospora boll rot of Cotton found in Texas.** —Abs. in *Phytopathology*, **49**, 5, p. 315, 1959.

N. gossypii [map 153] was found associated with a boll rot of cotton in the Waco area in 1957; the rot was noticed at the Lubbock Station in 1952 (the 1st record for the U.S.A.) and a survey in 1958 showed its presence throughout the State. Boll inoculations by the toothpick method were about 10% effective.

Kublanovskaya (Mme G. M.). Стерильные и нестерильные препараты актиномицетов как средство борьбы с увяданием Хлопчатника. [Sterile and non-sterile actinomycete preparations as a means of Cotton wilt control.]—Труд. Ташкентск. сел.-хоз. Ин-та [*Trud. Tashkentsk. sel.-khoz. In-ta*], *1957*, 9, pp. 21–26, 1957. [Abs. in *Referat. Zh. Biol.*, *1959*, 10, p. 215, 1959.]

In experiments at the Tashkent Agricultural Institute and the All-Union Cotton Research Institute, Uzbekistan, the preparations No. 144 and No. 1607, consisting of cotton seed cake with actinomycetes, gave 50–70% control of cotton wilt [*Verticillium alboatrum*: **38**, p. 599] when tried in different geographical zones.

Anselme (C.). **L'état sanitaire des semences et la culture du Lin.** [The sanitary condition of the seed and the cultivation of Flax.]—*Bull. tech. Ing. Serv. agric.* 129, pp. 203–211; 21 fig., 1958. [59 ref.]

In a further paper in this series [cf. **38**, p. 260] the author discusses the selection of flax vars. for resistance to diseases [cf. **36**, p. 187], modern methods of cultivation, the origin of parasites of large-scale crops of flax (soil, neighbouring crops, seed), and seed infection during harvest and in storage. Useful notes are given on seed-borne diseases of flax, including *Ascochyta linicola* [**38**, p. 85], *Colletotrichum lini* [*C. linicola*: cf. **38**, p. 408], *Polyspora lini* [loc. cit.], *Septoria linicola* [cf. **35**, p. 451], and *Melampsora lini*. The symptoms of infection shown by flax seed are considered, and there is a brief discussion of the conditions necessary for the production of a good flax crop.

A key for the identification of flax diseases [issued separately] is arranged according to the symptoms at the different stages of plant development, each disease being figured.

Viado (G. B.) & Matthysse (J. G.). **A field test on the use of insecticides and cover-cropping and their bearing on the control of Abaca mosaic.**—*Philipp. Agric.*, **42**, 8–9, pp. 364–373, 1959.

It is believed that maize mosaic virus, sugarcane mosaic virus, and canna mosaic virus may be involved, together with abaca mosaic virus [? str. of cucumber mosaic virus], in the production of mosaic symptoms on abaca [*Musa textilis*: cf. **36**, p. 321], the several vectors that transmit these complicating control. Treatments with systox gave poor results, BHC sprayed on both crop and weeds was more effective, and a cover crop of *Centrosema plumieri* provided the best protection (12% infection, untreated 33·4).

Prentice (I. W.). **Virus disease problems in flower crops.**—*Sci. Hort.*, **13** (*1957–58*), pp. 90–96, 1958. [9 ref.]

Of the chrysanthemum viruses discussed in this general paper, [tomato] aspermy virus [**35**, p. 298], chrysanthemum stunt virus [**34**, p. 788] (which can sometimes be mistaken for a virus complex containing aspermy), viruses B and D, vein mottle

[**37**, p. 238], and ring pattern are mentioned. Virus D causes flower distortion and colour breaking in some vars.; no vector has been found, but the virus is potentially dangerous. Ring pattern causes severe leaf markings on some vars. particularly Roseverne in the spring, but disappears later: no vector is known, and the disease is not considered an important one. The methods for provision of healthy chrysanthemum stocks are discussed [**34**, p. 512; **38**, p. 321].

Viruses infecting anemone [**36**, p. 591; **38**, p. 7], carnations [**35**, p. 100], gladiolus [**37**, p. 665], and other bulbs and corms are enumerated and discussed. Many of the viruses are so common and widespread that clean stocks, if achieved, would not remain so for long. Nevertheless a scheme might be started for standard vars. for the cut flower trade, while the worst vars. and plants are being eliminated by roguing.

Zschau (K.). **Eine Ring- und Bandchlorose der Aster (Callistephus chinensis Nees) hervorgerufen durch das Tabakmauche-Virus.** [A ring and band chlorosis of Aster (*C. chinensis*) caused by Tobacco 'mauche' virus.]—*NachrBl. dtsch. PflDienst, Berl.*, N.F., **12**, 12, pp. 231–234, 1 pl., 1958. [Russian and English summaries.]

A comparison of the host range and physical properties at the Biologische Zentralanstalt der Deutschen Akademie der Landwirtschaftswissenschaften, Berlin, with those recorded for aster ring spot virus [str. of tobacco ring spot virus: **33**, p. 675] indicated that the 2 viruses may be identical.

Plakidas (A. G.). **Cercospora theae on Camellia sasanqua and Thea sinensis.**—*Plant Dis. Reptr*, **43**, 6, pp. 668–669, 3 fig., 1959.

C. theae [map 247] caused severe infection of the camellia vars. Texas Star and Pink Snow (but no others) in a Louisiana nursery and was also found on potted tea plants at Baton Rouge. In reference to its world distribution occurrence in Italy [cf. Chupp, **33**, p. 635] is noted.

Brierly (P.) & Lorentz (P.). **A virus from florists' Chrysanthemums with some characteristics of Tobacco mosaic virus.**—*Plant Dis. Reptr*, **43**, 7, pp. 685–687, 1959.

This virus, isolated during routine indexing in Ohio, is apparently poorly adapted to chrysanthemums; it was lost from the source plants during propagation and failed to cause systemic infection in inoculated vars. It produced symptoms similar to those of tobacco mosaic virus on *Nicotiana glutinosa* and *Chenopodium amaranticolor*, but failed to infect 3 vars. of bean (*Phaseolus vulgaris*). It was inactivated at 85–90° C., withstood dilution to 10^{-6} and ageing for $>$ 4 months at 20°, and was not soil-borne. It failed to precipitate with TMV antiserum.

Roland (G.). **Étude d'un virus du Chrysanthème.** [A study of a Chrysanthemum virus.]—*Parasitica*, **15**, 2, pp. 43–52, 10 fig., 1959.

In further studies at the Station de Phytopathologie de l'État, Gembloux, in 1955–6, on the virus strain, closely resembling Noordam's strain *Chrysanthemum* (str. Chr.) of cucumber mosaic virus [**35**, p. 582], isolated from a chrysanthemum plant, it was found that inoculation symptoms on tobacco, *Nicotiana glutinosa* [cf. **32**, p. 560], and *N. rustica* were very much like those caused by Noordam's strain. Both viruses failed to induce generalized symptoms on cucumber, and were similar in their mode of transmission by *Myzus persicae*, T.D.P. (50–65° C. for the author's strain), their antigenic activity, the protection afforded against the yellow variant of cucumber mosaic virus, and the protection given to plants previously infected with cucumber mosaic virus against the virus from chrysan-

themum. The author's strain differed slightly from Noordam's in the symptoms produced on *Datura stramonium* (on which the former did not cause reduction of the leaf blades), sunflower (no symptoms), tomato (atrophy of the young leaves), and *Tropaeolum majus* (mosaic only). It is concluded that both are strains of Noordam's str. Chr. From a comparison of these results with those of others the author considers that his virus and tomato aspermy virus [cf. **38**, p. 409 *et passim*] are the same as cucumber mosaic virus and accordingly proposes that both should be referred to as *Cucumis virus* 1 [cucumber mosaic virus] var. *Chr.* Noordam.

Swenson (K. G.) & Nelson (R. L.). **Relation of aphids to the spread of Cucumber mosaic virus in Gladiolus.**—*J. econ. Ent.*, **52**, 3, pp. 421–425, 1959.

A survey was made in 1957 of the aphid spp. occurring on gladiolus in the Willamette Valley, Oregon, where cucumber mosaic virus is responsible for white-break disease [**36**, p. 648]. The virtual absence of colonization on the host and the presence of alatae of at least 18 spp. led to the conclusion that the spread of infection would be largely attributable to migrants. In tests with a type strain of the virus and an isolate from gladiolus transmission was effected by *Amphorophora rhododendri*, *A. sonchi*, *Aphis cardui*, *A. fabae* (the most widespread sp.), *Brevicoryne brassicae*, *Macrosiphum barri* (gladiolus isolate only), *M.* [*Aulacorthum*] *pisi*, *M. rosae*, *M. solanifolii*, *Myzus circumflexus*, *M. persicae*, and *Rhopalosiphum pisi* (type strain only). It is thought probable that the majority of colonizing or migrating spp. found in a herbaceous crop susceptible to the virus would act as vectors.

Of 12 aphid spp., *Amphorophora rubitoxica*, *A. sonchi*, *A. gossypii*, *Aulacorthum pisi*, *Macrosiphum rosae*, and *M. solanifolii* proved capable of transmitting an isolate from *Daphne*, but the aptitude was lost during a 9-month period or reduced to a level of efficiency undetectable by tests comprising 1,100 individuals of *Myzus persicae*.

Runnels (H. A.) & Wilson (J. D.). **Gladiolus dry rot.**—*Flor. Exch.*, **132**, 2, p. 19, 1959. [*Biol. Abstr.*, **33**, 9, p. 2879, 1959.]

At Ohio Experiment Station, Wooster, no differences were observed in emergence, top growth, and flower production when healthy Snow Princess gladiolus corms and others infected by dry rot [*Sclerotinia gladioli*: **38**, p. 148] were planted in plots 3 weeks after the rototilled soil had been treated with either mylone (85 W) at 200 lb./acre, 75% terraclor (133 lb.), or 50 gal. vapam, or left untreated, but the terraclor plots yielded more corms free from dry rot.

Kirchner (H.-A.). **Die Einwirkung eines quecksilberhaltigen Desinfektionsmittels auf Gloxinien (Sinningien).** [The effect of a mercurial disinfectant on Gloxinias (*Sinningia*).]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **13**, 3, pp. 55–56, 1 fig., 1959. [Russian and English summaries.]

At the Institut für Phytopathologie und Pflanzenschutz, University of Rostock, Germany, severe injury occurred on greenhouse gloxinias growing in pots standing on a layer of peat which had been treated with 0·7% ceresan (1 l./m.^{2}). The damage was more conspicuous before flowering, the buds dying away and the few which opened being deformed and ragged.

Plakidas (A. G.). **Chlorotic spot, a graft-transmissible disease of Ligustrum.**—*Plant Dis. Reptr*, **43**, 7, pp. 688–689, 3 fig., 1959.

This disease, described from Louisiana State University, Baton Rouge, caused numerous pale to bright yellow spots from pin-head size to 5 mm. diam. on the foliage of *Ligustrum lucidum*; sometimes chlorotic rings with a minute, green, central dot were formed, and occasionally the lesions, which were depressed and 'pock marked' the leaf, were necrotic. Symptoms developed on new growth in

spring. A mild form of the disease appeared common in the Baton Rouge area. The disease is considered to be of virus nature; the majority of privet plants appear to be tolerant, only a few showing striking symptoms.

MacLeod (D. J.). **Report on an examination of the virus diseases of the Bermuda Lily.**—17 pp., Fredericton, N.B., Canada Dept Agric., [? 1959. Cyclostyled].

The virus infections of *Lilium longiflorum* in Bermuda include lily rosette (yellow flat) [**8**, p. 383] which is best diagnosed with certainty by examination of leaf sections fixed in acid formalin, processed in paraffin, and stained in 0·05% trypan blue in physiological salt solution; there is a specific necrosis of the vascular tissues. Oleander, *Vinca rosea*, and *Apocynum* sp. showed similar symptoms and should be studied as possible hosts.

Lily fleck is caused by the interaction of cucumber mosaic virus and lily symptomless virus [**24**, p. 18; **38**, p. 86], severity of the disease depending on the strain of the former involved. The strain found in wild cucumber (*Echinocystis lobata*) can induce a severe form of fleck termed streak [loc. cit.], but the presence of this host in Bermuda was not ascertained, though more extreme types of fleck are sometimes encountered there.

Mosaic symptoms due to various manifestations of tulip breaking virus [**28**, p. 174 *et passim*] are also encountered and may be confused by the presence of deficiency chloroses. The report concludes with notes on standard methods of virus control.

Vladimirskaya (Mme M. E.). Фомоз Флоксов. [Phomosis of Phlox.]—Цветовод. [*Tsvetovod.*], *1958*, 5, p. 27, 1958. [Abs. in *Referat. Zh. Biol.*, *1959*, 11, p. 214, 1959.]

Heavy infection of phlox occurred in the gardens of Pushkin, Leningrad region, and especially in Leningrad. Phomosis [*Phoma* sp.: cf. **20**, p. 582] of perennial phlox appears on 3 yr.-old plantings, heavily infecting the root, stem, and branchlets. Infection tests on 1-yr.-old phlox were negative. It was established that the fungus in natural conditions overwinters as pycnidia or mycelium. Recommendations are made for control.

Inman (R. E.) & Weihing (J. L.). **Cyprex : a superior control for shothole disease of Chokecherry.**—*Plant Dis. Reptr*, **43**, 5, pp. 536–539, 2 fig., 1959.

At the University of Nebraska, Lincoln, cyprex at 1 lb. wettable powder/100 gal. (9 applications between 11 May and 3 Sept.) was found to be far the most effective of 8 fungicides tested against *Coccomyces* [*Higginsia*] *lutescens* on nursery chokecherry [*Prunus virginiana*: **23**, p. 370] 1 yr. seedlings; the plant is extensively used as a windbreak. An overall rating (sum of 0–4 ratings for incidence, severity, defoliation, and plant vigour) was 4·73 for cyprex, compared with 11·33 for the next best fungicide (2 lb. parzate), and 16 for the untreated.

Protsenko (E. P.). О возбудителе „ожога" Роз. [On the causal agent of 'burn' of Roses.]—Бюл. главн. бот. Сада [*Bull. centr. bot. Gdn. Moscow*], *1959*, 33, pp. 109–111, 1959.

In further studies [cf. **36**, p. 587] at the Central Botanical Gardens, Moscow, *Coniothyrium wernsdorffiae* was determined as the primary cause of 'burn' prevalent on rose stems in the Moscow region. It was thought previously that *C. wernsdorffiae*, *C. fuckelii* [*Leptosphaeria coniothyrium*], and *C. rosarum* all caused diseases of rose bark; the last 2 are now considered identical while *C. wernsdorffiae* is different morphologically and biologically [**9**, p. 723]. *L. coniothyrium* infects not only rose stems and fruit, but also apple, European dewberry, willow, and raspberry, while

C. wernsdorffiae is restricted to rose stems. *L. coniothyrium* is of much less frequent occurrence.

Josifović (M.) & Šutić (D.). **Septoria helianthi Ell. et Kell. le parasite dangereux du Tournesol en Jougoslavia.** [*S. helianthi* the dangerous parasite of the Sunflower in Yugoslavia.]—*Bull. Acad. serbe Sci. nat.*, **18**, pp. 43–55, 1957. [Abs. in *Z. PflKrankh.*, **66**, 5, p. 295, 1959.]

There is no adequate control of this disease [cf. **37**, p. 443], new for Yugoslavia, but seed disinfection is recommended. With the increasing cultivation of sunflowers in the Balkans and the Near East, more attention should be paid to infection by *S. helianthi*.

Saksena (H. K.) & Singh (B. B.). **Blight of Marigold, Tagetes erecta, caused by Colletotrichum capsici (Syd.) Butl. & Bisby.**—*Plant Dis. Reptr*, **43**, 6, pp. 670–673, 3 fig., 1959.

This disease, found at the Govt Agricultural College, Kanpur, India, and in many nearby gardens causes grey spots on the involucre which coalesce, become water-soaked, and initiate a wet rot that progresses downwards to kill peduncles, petioles, and finally branches. The disease is worst in wet weather. The fungus, newly recorded on this host, was shown to cause fruit rot of *Capsicum annum*; *T. erecta* was infected by isolates from chilli. Spraying with 1% Bordeaux mixture and 2% zineb at 2-week intervals effected control.

Chiu (R.-J.) & Sill (W. H.). **Datura stramonium L., a possible quantitative bioassay host for the Bromegrass mosaic virus.**—*Plant Dis. Reptr*, **43**, 7, pp. 690–694, 3 fig., 1959.

In further studies [cf. **38**, p. 603] at Kansas State University, Manhattan, *D. stramonium*, sap-inoculated with brome mosaic virus [**38**, p. 503] by carborundum rubbing, developed local chlorotic rings with a light green centre. Systemic infection appeared in plants from which the apical shoots had been removed. The lesions were more easily counted than those on *Chenopodium album*, the only other to develop symptoms of 33 spp. and vars. of plants tested. The no. of lesions was directly related to virus conc. in sap diluted beyond 10^{-2}. With 1 out of 15 collections of the virus tested, somewhat larger and fainter lesions formed, possibly indicating a different strain.

Christensen (E. V.) & Wilcoxson (R. D.). **Factors affecting the development of Rhynchosporium scald on Brome grass.**—*Phytopathology*, **49**, 7, pp. 397–399, 1 graph, 1959.

At the Institute of Agriculture, University of Minnesota, St. Paul, potted plants of *Bromus inermis*, sprayed with a spore suspension (400,000 conidia/ml.+1 drop polyethylene glycol 400 (monolaurate)/50 ml.) of *R. secalis* [**38**, p. 140] (grown and stored on a mixture of barley and wheat) and held for 48 hr. in moist chambers under shade in the greenhouse at 18, 24, or 29° C., developed an av. of 15·8, 10·4, and 3 lesions/leaf, respectively. Increase in either inoculum conc. or time in the moist chambers increased the amount of infection. Rapid drying of inoculated plants at 29° reduced infection, which was increased by rubbing the leaf before inoculation (fingers in heavy canvas gloves) and was also greater in younger leaves. Clonal resistance and susceptibility was similar in greenhouse and field.

Latch (G. C. M.) & Wenham (H. T.). **Fungal leaf-spot diseases of Cocksfoot (Dactylis glomerata L.) in the Manawatu. III. Eyespot caused by Selenophoma donacis var. stomaticola (Baueml.) Sprague et A. G. Johnson, and scald caused**

by Rhynchosporium orthosporum Caldwell.—*N.Z.J. agric. Res.*, **2**, 3, pp. 544–551, 8 fig., 1959. [17 ref.]

In this further contribution [cf. **38**, p. 148] the 2 diseases and the causal fungi, recorded for the 1st time on cocksfoot in New Zealand, are described. Neither is of economic importance in the area.

Britton (M. P.) & Cummins (G. B.). **Subspecific identity of the stem rust fungus of Merion Bluegrass.**—*Phytopathology*, **49**, 5, pp. 287–289, 1 graph, 1959.

From studies at Purdue University, Lafayette, Indiana, on the infection types produced on a large number of grass spp. by *Puccinia graminis* isolated from Merion bluegrass (*Poa pratensis* var.) [cf. **35**, p. 894] and the percentage of uredospores with 3, 4, and 5 pores in collections from these hosts it is concluded that the rust in question is a physiologic race of *P. g.* f.sp. *agrostis*.

Myers (D. J.). **Rust, Rye grass, Phalaris tuberosa and autumn-saved pastures.**—*J. Dep. Agric. Vict.*, **57**, 6, pp. 367–368, 2 fig., 1959.

Perennial and H[ybrid] I[talian] rye grasses [*Lolium perenne* and *L.* × *multiflorum*] in autumn pastures suffered this year unusually severe damage from rust [*Puccinia coronata*: **36**, p. 649] (serious because of its unpalatability to cows) in many districts round Melbourne and as far afield as Fish Creek in South Gippsland. The value of *Phalaris tuberosa* in this connexion is emphasized and discussed.

Wells (H. D.). **Annual Ryegrass, Lolium multiflorum, host for Sclerotium rolfsii.**—*Plant Dis. Reptr*, **43**, 7, p. 834, 1959.

A new host record, from Tifton, Georgia. A basal sheath and stalk rot occurs.

Stapel (C.). **Nogle sygdomsproblemer i Græsfrøsmark erne.** [Some pathological problems in grass seed fields.]—Reprinted from *Tidsskr. Frøavl, 1959*, 563, 8 pp., 6 fig., 1959.

Popular notes concerned mainly with insect pests but including references to a few well-known diseases, e.g. bacteriosis [*Corynebacterium rathayi*: map 156] of dog's tooth grass [*Cynodon dactylon*] and ergot [*Claviceps purpurea*] of quack grass [*Agropyron repens*: cf. **33**, p. 474], in Denmark.

Ramazanova (Mme S. S.). Новое в биологии возбудителя цветочной плесени Клевера **Botrytis anthophila Boud.** [New data on the biology of the causal agent of clover anther mould *B. anthophila*.]—*Trud. vsesoyuz. In-ta Zashch. Rast., 1958*, 10, pp. 153–165, 1958. [Abs. in *Referat. Zh. Biol., 1959*, 11, p. 209, 1959.]

At the Yachevskiĭ Laboratory of Mycology, chlamydospores, gemmae, and sclerotia of *B. anthophila* [cf. **37**, p. 731] were studied during the development cycle of strains in culture. It was possible to infect healthy growing clover plants by conidia introduced at the growing point. The narrow specialization of the fungus was shown; control measures are advocated.

Curl (E. A.) & Hansen (J. D.). **Microbial relationship and antibiotic effects associated with Sclerotium rolfsii in Trifolium repens.**—Abs. in *J. Ala. Acad. Sci.*, **30**, 2, pp. 4–5, 1958.

The predominant fungi in each of 3 zones (dead, discoloured, and green tissue) of white clover stolons from experimental fields in Alabama [**35**, p. 300] were *Fusarium* spp., Mucoraceae, *Sclerotium rolfsii*, and *Trichoderma* sp. *F.* spp. were most prevalent in the green zones of infected stolons and also in healthy, while the sound tissue beyond the infected yielded fewer Mucoraceae and no *S. rolfsii* or *T.* sp. *Colletotrichum* sp., *S. bataticola* [*Macrophomina phaseoli*], and *Curvularia trifolii*

were isolated from all zones of infected stolons and the 1st-named also from apparently healthy material. Some 53% of the fungi, 17% of the bacteria, and 33% of the streptomycetes isolated from the stolons were antagonistic in culture to *S. rolfsii*, which in turn inhibited 20% of the fungi. Sclerotial production was suppressed by some [unspecified] isolates in each group and promoted by others.

Panzer (J. D.). **The effect of Alfalfa mosaic virus on root development of Alfalfa cuttings.**—*Plant Dis. Reptr*, **43**, 7, p. 697, 1959.

Studies at S. Dakota State College, Brookings, showed that lucerne mosaic virus [cf. **38**, p. 249] impaired development and growth of lucerne roots, particularly under poor growing conditions. Clones rooting poorly should therefore be suspected of and tested for virus infection.

Leach (C. M.). **A survey of root deterioration of Medicago sativa in Oregon.**—*Plant Dis. Reptr*, **43**, 6, pp. 622–625, 1959.

In a survey by the Oregon Agricultural Experiment Station, Corvallis, vascular discoloration, which varied with locality and increased with the age of the planting, was found in 59% of the lucerne roots examined; 64% were injured by insects and 39% showed superficial cortical discoloration. *Phoma herbarum* var. *medicaginis* [**38**, p. 213] (42%), *Fusarium solani* (29%), and *F. oxysporum* [cf. **35**, p. 461] (16%) were consistently isolated from discoloured root steles.

Leach (C. M.) & Hardison (J. R.). **Susceptibility of Alfalfa varieties to Physoderma alfalfae.**—*Plant Dis. Reptr*, **43**, 6, pp. 619–621, 1 fig., 1959.

At Oregon Agricultural Experiment Station, Corvallis, 24 vars. of lucerne and a seed lot of *Medicago falcata*, inoculated with *P. alfalfae* [cf. **28**, p. 577] by dusting spores over seedlings, proved susceptible, but there were varietal differences in degree of susceptibility (tabulated) after 3 yr.

Mihatsch (H.). **Beitrag zur Kenntnis einer Welkekrankheit der Luzerne unter besonderer Berücksichtigung der Sortenanfälligkeit.** [Contribution to the knowledge of a wilt disease of Lucerne with particular regard to varietal susceptibility.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F., **13**, 1–2, pp. 22–29, 2 fig., 4 graphs, 1959. [Russian and English summaries.]

In field experiments by the Institut für Phytopathologie, Naumburg, E. Germany, only the var. Pegauer (test nos. 2, 7, 14, and 20) and a *Medicago sativa* × *M. falcata* hybrid showed good resistance to *Verticillium alboatrum* [**37**, p. 416], producing good growth in the 3rd yr.

Walters (H. J.) & Cralley (E. M.). **Relation of host nutrition to the development of bacterial wilt of Alfalfa.**—Abs. in *Phytopathology*, **49**, 5, p. 320, 1959.

In greenhouse studies [in Arkansas] over 3 yr. Buffalo and Grimm lucerne were grown in sand culture at 27° C. with 3 levels of K (5, 25, and 50 p.p.m.) and 2 of N and P (25 and 50, 7·5 and 30); Ca, Mg, and trace elements remained constant. Susceptibility to *Corynebacterium insidiosum* [cf. **38**, p. 213] was clearly related to K level; growth was poorest and wilt most severe with high N and P and low K; the reverse conditions, with K medium or high, resulted in the lowest bacterial infection.

Lebeau (J. B.), Cormack (M. W.), & Moffatt (J. E.). **Measuring pathogenesis by the amount of toxic substance produced in Alfalfa by a snow mold fungus.**—*Phytopathology*, **49**, 5, pp. 303–305, 6 fig., 1 graph, 1959.

In experiments by the Science Service Laboratory, Lethbridge, Alberta, and the Canada Agricultural Research Laboratory, Saskatoon, lucerne plants were

inoculated in Oct. in the field at Edmonton by Cormack's method [cf. **27**, p. 526] with the unidentified basidiomycete causing winter crown rot [**35**, p. 528; **37**, p. 363]. HCN, determined in crown buds twice a month throughout the winter, began to develop in quantity towards the end of Jan., reaching a max. of 500 p.p.m. in mid-March and falling to nil again at the end of Apr. Mycelium of the pathogen was observed among the outer bud scales and leaf rudiments during winter, but was not found in the crown bud until positive tests were obtained for HCN. Though abundant mycelial growth occurs on the ground in early spring, failure of the host to absorb and retain the HCN when temps. are much above freezing probably renders the fungus harmless at that time. Inoculations were also made on 1st yr. plants in 1953–55 from mid Sept. to mid Nov. and survival of plants checked the following June. Infection was greatest with inoculations around 1 Oct., no disease developed on plants inoculated in mid Nov.

Kuć (J.), Barnes (E.), Daftsios (A.), & Williams (E. B.). **The effect of amino acids on susceptibility of Apple varieties to scab.**—*Phytopathology*, **49**, 5, pp. 313–315, 1959.

At Purdue University, Lafayette, Indiana, solutions of amino acids were infused into the cut mid-ribs of lower leaves, from which most of the blade had been removed, of 1–2½ ft. tall apple trees for 24 hr. (4–8 ml. being taken up) before inoculation of the upper leaves with *Venturia inaequalis* [cf. **37**, p. 411]. D- or DL-phenylalanine reduced the number and size of sporulating lesions in 5 vars. susceptible to races 1, 2, and 3 [**35**, p. 829; **38**, p. 150], but did not cause a resistant reaction. The Russian var. R 12740–7A, normally susceptible to race 2 and resistant to 1 and 3, and Geneva, normally susceptible to 3 and resistant to 1 and 2, became resistant to all 3 races, small pin points or non-sporulating necrotic or chlorotic areas replacing the susceptible reactions. The L-isomer did not alter the disease reaction of any of the 7 vars. tested. D-alanine, DL-α-aminobutyric acid, and to a lesser extent D- and DL-leucine behaved similarly to the phenylalanines in the Russian var., but DL- or L-alanine, L-leucine, DL-, D-, or L-tyrosine, DL-, D-, or L-dihydroxyphenylalanine, and DL- or L-cysteine hydrochloride had no effect. The DL-, D-, and L-isomers of dihydroxyphenylalanine were inhibitory *in vitro* to isolates of *V. inaequalis* but none of the other amino acids appeared so at concs. equal to those in the infusion.

Kosswig (W.). **Bemerkungen zur Biologie und Bekämpfung des Erregers des Apfelmehltaus Podosphaera leucotricha (Ell. et Ev.) Salm.** [Observations on the biology and control of the agent of Apple mildew *P. leucotricha*.]—*Z. PflKrankh.*, **66**, 5, pp. 263–272, 1959. [English summary.]

Results are reported from the Institut für Pflanzenkrankheiten, University of Bonn, of observations of infected buds on 1 yr.-old long shoots on Jonathan apple trees, made during 1956–7 and repeated in the spring of 1958, at the experimental farm of Farbenfabrik Bayer-Leverkusen. Only the terminal bud was of importance for overwintering of the fungus [cf. **38**, pp. 89, 607]. Leaf buds were more susceptible than flower buds. Dead axillary buds occurred mainly on branches having a dead terminal bud, and infected living axillary buds mainly on branches with an infected living terminal bud.

Taylor (J.). **The distinctive nature of some Apple disease conditions in Georgia.**—*Plant Dis. Reptr*, **43**, 6, pp. 654–657, 1959. [21 ref.]

Observations by the Georgia Mountain Experiment Station, Blairsville, have shown that *Physalospora obtusa* [**37**, p. 240; **38**, p. 266] is a major cause of fruit rotting in the State, probably largely owing to inefficient orchard practice. *Botryosphaeria ribis* [loc. cit., **37**, p. 289] is of little account, as local vars. of apple, with the

exception of Golden Delicious, are not seriously damaged; *Botrytis cinerea* [**31**, p. 190] is also unimportant. *Podosphaera leucotricha* [**37**, p. 486] has proved serious only in an orchard at high altitude, and *Gymnosporangium juniperae-virginianae* [**37**, p. 240] is unimportant because of the rarity of its alternate host, red cedar [*Juniperus virginiana*].

Pavlenko (V. V.). О роли ветрозащитных полос в борьбе с черным раком Яблонь. [On the role of wind-breaks in the control of black canker of Apple trees.]—Защ. Раст., Москва [*Zashch. Rast., Moscow*], **4**, 2, p. 52, 1 fig, 1959.

During a survey of orchards in the Poltava region in 1956 the connexion between infection of apple trees by *Sphaeropsis malorum* Peck [*Physalospora obtusa*: cf. **36**, p. 554] and the absence of wind protection was noted. At the 'Iskra Lenina' State farm 46% (var. Pepin litovskiĭ), located in the NE. part of the orchard and lacking wind protection, were infected, but in the larger part of the orchard surrounded by forest only 1% (var. Antonovka obȳknovennaya). Further observations in other places confirmed this connexion. The fungus especially attacks trees which have suffered mechanical damage or have frost injury.

Brook (P. J.). **Experiments on the control of ripe spot on Sturmer Apples.**—*N.Z.J. agric. Res.*, **2**, 3, pp. 463–474, 1959.

Satisfactory control of ripe spot (*Gloeosporium* [*Neofabraea*] *perennans*) and *G. album* [**37**, p. 88] was obtained by a spray programme directed more particularly against *N. perennans*, including phenyl mercury chloride [cf. **38**, pp. 528, 608], until about mid-Dec., and regular protective applications of captan through the latter part of the season. As *G. album* has a wide host range [**38**, p. 90] an inoculum of conidia can be built on other hosts, from which the spores will reach apples throughout the summer. Cold storage alone (36–38° F.) will prevent a large part of the potential amount of ripe spot from developing. The delay between harvest and cool storage should be as short as possible, but experiments showed that a lapse of 7 days may not increase the subsequent extent of the disease.

Olsson (K.). **Försök med DNOC mot Gloeosporium.** [Experiments with DNOC against *G.*]—*Växtskyddsnotiser, Stockh.*, **22**, 5–6, pp. 80–83, 2 fig., 1959.

Although 0·075% DNOC inhibited sporulation of *G. album* and *G.* [*Neofabraea*] *perennans* in laboratory tests, spraying Ribston Pippin and Cox's Orange in a Swedish apple orchard in Apr. 1957 and 1958 with 5% DNOC in an oil emulsion or at 0·75% alone proved ineffectual. In this connexion the life-cycle of the fungi is outlined, with special reference to their capacity for sporulation throughout the year and its abundance during the summer [cf. above].

Melitskiĭ (L. V.) & Tsekhomskaya (Mme V. M.). Функциональные расстройства у Яблок при хранении и мери борьбы с ними. [Functional disorders of Apples during storage and their control.]—Биохим. Плод. Овощ. [*Biokhim. Plod. Ovoshch.*], *1958*, 4, pp. 42–50, 1958. [Abs. from D.S.I.R. translation.]

This paper from the All-Union Scientific Research Institute for the Canning and Fruit-drying Industry, Russian S.F.S.R., deals mainly with scald, the most widespread functional disorder of stored apples [cf. **38**, p. 266]; others mentioned are a browning of the skin and pulp of the vars. Antonovka and Kal'vil' snezhnyĭ, Jonathan spot, a skin browning resembling scald on Wagner Prize, and glassiness.

Scald is accompanied by an accumulation of alcohol and acetaldehyde, though the content in freshly picked fruit varies considerably according to conditions of cultivation. Rosmarin apples picked in 1952 contained, on the whole, less than those of the 1953 harvest, and, furthermore, the 1952 apples affected by scald contained less than healthy fruit of the following year. Respiratory activity in

freshly picked apples from the central zone was higher than in southern zone apples, which tend to keep better; however, activity in Boïken, highly resistant to scald, is no less than that of Parmen zimniĭ zolotoĭ, which keeps less well, and scarcely differs from that of Rozmarin, the most susceptible. It was shown for several apple vars. that resistance to anaerobiosis is greatly increased in the last stages of ripening. Of the Rozmarin apples picked on 3 Sept. and stored at 0° C. in tissue paper 48% showed some degree of scald after 5 months, whereas those picked 10 days later were sound. After 7 months' storage 65 and 15%, respectively, were affected. Premature picking of Antonovka was found to invalidate the measures adopted for scald protection, including wrapping in oiled paper; within 3½ months of storage at 0°, 50% of the wrapped apples picked on 24 Sept. were affected by scald, compared with only 2% for 4 Oct. Wagner Prize, picked on 8 Oct., was 62·4% affected by 24 Mar., but only 17·4% in the 15 Oct. picking. Though resistance to anaerobiosis increases during ripening it decreases during storage. This is one of the main differences between ripening on the plant, when scald resistance increases, and secondary ripening after harvest. Lowest resistance to anaerobiosis occurs in apples affected by scald. Air permeability of the skin decreases during storage, and more rapidly in apples affected by scald than in healthy fruit. In apples highly susceptible to scald alcohol and acetaldehyde accumulate in much greater quantities than in resistant vars.; during 7 months' storage the alcohol content of the skin of Rozmarin increased 4-fold and that of the pulp 7-fold, whereas in Boïken the increase was only 50%.

Kienholz (J. R.). **Are viruses concerned in Pear decline?**—*Plant Dis. Reptr*, **42**, 10, pp. 1194–1195, 1958.

Observations at the Crops Research Division, Hood River, Oregon, suggest that if certain viruses are present in trees of Oriental and French combinations, pear decline symptoms caused by other factors may be hastened or aggravated. There is evidence of incompatibility when Oriental spp. are used either as scions or stocks for pear [cf. **38**, p. 609].

Rojecka (Nadzieja). **Ze studiów nad Entomosporium maculatum Lév.—Brunatna plamistość—wraz ze sposobami jej zwalczania.** [On *Fabraea maculata* brown spot and methods of control.] *Roczn. nauk rol.*, A **75**, 2, pp. 255–265, 1957. [Abs. in *Referat. Zh. Biol., 1959*, 10, p. 216, 1959.]

A study of the morphology and biology of *F. maculata* [**38**, p. 165] was carried out at the Institute for Horticulture, Antopol' (near Puławy), Poland, on Caucasian vars. of wild pears. Fungicides with a Cu content are recommended for control and the most efficient appears to be Bordeaux mixture.

Caporali (L.). **Contribution a l'étude du comportement de Taphrina deformans (Berk.) Tul. en culture in vitro.** [Contribution to the study of the behaviour of *T. deformans* in culture *in vitro*.]—*C. R. Acad. Sci., Paris*, **249**, 3, pp. 441–443, 7 fig., 1959.

On a rich agar medium containing maltose, dextrines, albumins, lecithines, peptones, and B vitamins, *T. deformans*, isolated during the dormant period from peach branches infected in the previous year, produced an abundant mycelium with numerous budding conidia, which either reproduced the mycelium or developed into brown-pigmented resting spores [cf. **4**, p. 447; **14**, p. 374]. Zonation is a marked feature in older colonies (20–25 days).

Milbrath (J. A.) & Swenson (K. G.). **Field spread of ring spot virus of stone fruits from Squash to Squash.**—*Plant Dis. Reptr*, **43**, 7, pp. 705–709, 1959.

In studies by the Oregon Agricultural Experiment Station, Corvallis, and the U.S.

Dept Agric. in 1957 alternate hills in 2 rows of Buttercup squash [cf. **36**, p. 332], planted in an orchard where natural spread of [peach] ring spot virus [**38**, p. 531] between Montmorency cherry trees had occurred, were inoculated with this virus when the cotyledons were fully expanded; 39 of 46 inoculated plants developed symptoms and 5 of 46 uninoculated. In a similar experiment in 1958 20 of 64 non-inoculated squash plants became infected. Natural infection, which decreased as the distance from inoculated plants increased, was thus shown to operate by a vector, but none of the insects found in the plots transmitted the virus under experimental conditions.

Crosse (J. E.). **Bacterial canker of stone-fruits. IV. Investigation of a method for measuring the inoculum potential of Cherry trees.**—*Ann. appl. Biol.*, **47**, 2, pp. 306–317, 1 pl., 4 graphs, 1959. [21 ref.]

In further research at East Malling Research Station [cf. **36**, p. 598; **38**, p. 611] *Pseudomonas mors-prunorum* was found on healthy cherry leaves during the autumn in numbers indicating that these colonies were the main source of inoculum for infection of the stems and branches. Quantitative estimates were obtained by shaking leaves in water and plating out the washings. As it appeared that counts in autumn would provide a measure of the inoculum available for stem and branch infection, the method was examined as a possible means of comparing the inoculum potentials on different cherry vars.

The numbers of the pathogen isolated from individual leaves varied from 0–153,500. There were significant differences between branches ($P = 0{\cdot}05$) but not between trees of the same var. It was estimated that a sample of 192 leaves, 8 from each of 24 branches, would be sufficient to show differences between vars. if sufficiently replicated in time. The accuracy of a 24-branch sample was tested by comparing parallel samples taken on different occasions from 2 separate groups of 12 Napoleon trees in an experimental plot, 1 of which had received a pre-blossom spray of Bordeaux mixture 3–4 weeks before the 1st sampling while the other was unsprayed. Each 24-branch sample (8 leaves $\times$ 2 branches/tree) was washed in 4 l. distilled water in a 6 l. conical flask, and bacterial counts were made after 4 hr. Samples were collected over 2 successive seasons and combined to give 17 different comparisons. The results, as log numbers of bacteria/g. dry wt. of leaf showed a highly significant correlation ($r = 0{\cdot}9729$) between the 2 series; analysis of variance further revealed very highly significant differences between occasions, but not between groups of trees. From the error variance it was calculated that to show differences between 2 such groups of trees, sampled on 5 different occasions, the differences would be significant if one group exceeded the other by 54%; similarly, with 10 or 15 successive samples, differences of 36 and 28%, respectively, would be required to show significance. At laboratory temp. 4 hr. washing was suitable, giving 80–90% recovery of bacteria without errors due to bacterial growth.

The inoculum potential of Napoleon was invariably greater than that of Roundel, the ratio between them in one instance approaching 4:1.

Pullularia pullulans was also extremely abundant on cherry leaves, together with a characteristic flora of non-parasitic bacteria.

Ciccarone (A.). **Note sulla patologia del Mandorlo con particolare riguardo alla Sicilia.** [Notes on the pathology of the Almond tree, with special reference to Sicily.]—*Tecn. agric.*, **10**, 1–2, pp. 371–408, 40 fig., 1958. [43 ref.]

This comprehensive and useful survey covers the damaging effects of cold spells at the end of winter, nutritional disorders [cf. **37**, p. 293], mosaic virus [cf. **36**, pp. 412, 476], other virus diseases recorded in various countries, bacterial diseases, including *Erwinia amylovora*, *Xanthomonas pruni*, *Pseudomonas syringae*, and *Agrobacterium tumefaciens*, and a large number of fungal diseases, including [in

addition to those in **38**, p. 357], *Sclerotinia laxa*, *Alternaria tenuis* [**37**, p. 173], *Tranzschelia pruni-spinosae*, *Taphrina deformans*, and others.

CADMAN (C. H.). **Modes of spread and the control of viruses in soft fruit crops.**—*Sci. Hort.*, **13** (*1957–58*), pp. 80–86, 1958. [21 ref.]

In this paper, read at the Horticultural Education Association Conference, Sept. 1957, after summarizing present knowledge of soil-, leafhopper-, and aphid-borne virus diseases of raspberry [**38**, p. 118] and strawberry [cf. **37**, pp. 491, 697] the author concludes that the prospects of devising a lasting solution to the problem of virus spread are more promising for raspberry, some vars. of which are immune from soil-borne or aphid-borne viruses [**38**, p. 611].

FRAZIER (N. W.) & THOMAS (H. E.). **Fate of Strawberry plants infected with Aster yellows virus in nursery beds.**—*Plant Dis. Reptr*, **43**, 6, p. 645, 1959.

Investigations by the University of California, Berkeley, and the Strawberry Institute of California, Morgan Hill, showed that if plants from clones infected by aster yellows virus [cf. **37**, p. 97; **38**, p. 218] are lifted and replanted they die shortly, any recovery being only temporary, indicating what may be expected if such plants are inadvertently set in new fields.

MCGREW (J. R.). **Spread of virus into Strawberry nursery stocks.**—*Plant Dis. Reptr*, **43**, 7, pp. 695–696, 1959.

Indexing by the U.S. Dept Agric. of a representative sample of 140 strawberry plants from 3 Delaware and E. Maryland nurseries after 2–6 yr. in the field, where they had been isolated by 1,000 yd. from other strawberry cultivations and dusted fortnightly with parathion from early spring to control vectors, showed only 6 plants infected by mild [strawberry] mottle virus [**37**, p. 97]. Protection against virus infection [**37**, p. 491] appeared satisfactory but field stocks should be replaced by virus-free material every 2–3 yr. [cf. **33**, p. 96].

MILLER (P. M.) & STODDARD (E. M.). **Control of grey mold on Strawberries.**—*Plant Dis. Reptr*, **43**, 6, pp. 646–648, 1959.

In further studies at Connecticut Agricultural Experiment Sta., New Haven [cf. **36**, p. 335], 3 sprays of 3 lb. thylate/100 gal. gave better control of *Botrytis cinerea* on Stelemaster and Sparkle than $\frac{3}{8}$ lb. phygon XL or 6 lb. orthocide 406, reducing post-harvest rot by $\frac{2}{3}$ at 16 days after spraying, though by 21 days there was little or no control. Lengthening the interval between the final spray and harvest increases the disease. None of the sprays was effective against leak (*Rhizopus nigricans*) [*R. stolonifer*], which was heavy and general.

STOVER (R. H.). **Bacterial rhizome rot of Bananas.**—*Phytopathology*, **49**, 5, pp. 290–292, 3 fig., 1959.

This disease, reported from La Lima, Honduras, affects in particular fields of Gros Michel in areas previously flood fallowed for 4–6 months, during the first 8–20 months after planting, when a loss of 10–15% is common and 50% of the banana clumps may be affected; thereafter the disease declines. It is also troublesome on methyl-bromide-fumigated or steam-sterilized soil in the greenhouse. Affected rhizomes develop regions of dark- to pale brown water-soaked tissue throughout the cortex and stele, often resulting in cavities surrounded by dark, spongy matter. Newly planted rhizomes may rot and fail to sprout. Young plants become stunted and yellow; older plants seldom show outward symptoms, but both are easily pushed or blown over. Suckers often remain healthy and roots are not attacked directly. *Erwinia carotovora* [**38**, p. 156] was isolated from the diseased areas and shown to reproduce rhizome rot on inoculation, disease symptoms above

ground appearing 8–10 weeks after inoculated rhizomes were planted in pots. Wounding increased disease severity. An agrimycin drench proved ineffective in greenhouse tests.

Volcani (Zafrira). **Bacterial soft rot of Avocado fruit. II.**—*Bull. Res. Coun. Israel, Sect. D.*, **7**, 1, pp. 39–42, 5 fig., 1959.

At the Agricultural Research Station, Rehovot, the causal organism [**33**, p. 738] was identified as *Erwinia carotovora* var. *aroideae*. It proved pathogenic to the fruit of 4 winter vars. of avocado and to tomato and pepper [*Capsicum* sp.] fruits. Typical black leg symptoms developed on wound inoculated potato plants [**33**, p. 377]. Fruit infection was best at 30–32° C., good at 36–37°, slow at 14°, and nil below 12° or above 38°. The bacterium differs from *E. atroseptica* only in its max. and opt. growth and pathogenicity temps., which are higher.

Tandon (R. N.) & Bilgrami (K. S.). **Leaf spot disease of Artocarpus heterophyllus caused by Phyllosticta artocarpina.**—*Proc. Acad. Sci. India*, Sect. B, **27**, 4, pp. 204–209, 1957. [*Biol. Abstr.*, **33**, 10, p. 3203, 1959.]

P. artocarpina was isolated from jak trees at Allahabad and pathogenicity was established by inoculation. Spores on diseased leaves were viable for 7–8 months and served as the source of inoculum for fresh infections. Spraying with 0·33% perenox or 3:3:50 Bordeaux reduced infection.

Setty (K. G. H.). **Blue mold of amla (Phyllanthus emblica L.).**—*Curr. Sci.*, **28**, 5, p. 208, 1959.

A rot of this fruit, in storage and in markets at Benares, India, caused by *Penicillium islandicum*, started as brown, water-soaked patches around a wound. Later 3 colour zones were apparent (bright yellow, surrounding purple brown, with a central bluish-green conidial mass) and a yellowish liquid was exuded. Some control was obtained by careful handling, gas treatment (NCl_3 and ozone) and good ventilation of the storage rooms, and use of mild antiseptics (borax or salt) on the fruit.

Graniti (A.). **Appunti sulla 'nebbia' del Carrubo in Sicilia.** [Notes on mildew of Carob in Sicily.]—*Ann. Canad. Sci. For.*, **7**, pp. 309–328, 4 pl., 28 graphs, 1958. [French summary. 14 ref.]

An account is given of observations on the biological characters of *Oidium ceratoniae* [cf. **27**, p. 25], the cause of mildew of the carob tree (*Ceratonia siliqua*), and upon the epiphytology of the disease in Sicily. The symptoms on the leaves and fruits are described and the effects of seasonal and environmental factors noted. The most favourable period for infection is Sept.–Dec. Heavily infected leaves are shed mainly in Feb. In July–Aug. a defoliation occurs which is mainly physiological in origin.

Male trees appear to be more susceptible than female and hermaphrodite. Among populations with female flowers, Amele de Bari and Racemosa appear to be more resistant than Giubiliana and Saccarata. Racemosa and Giubiliana flower late and so to some extent escape autumn infection.

Martelli (G. P.). **Infezioni fogliari di rogna dell' Olivo in gallerie di insetti minatori.** [Leaf infections of Olive knot disease in galleries of mining insects.]—Reprinted from *Inform. fitopat.* (*1958*), 4, 2 pp., 2 fig., 1958.

From minute tumours at the end of the gallery of an undetermined insect on the lower surface of an olive leaf the author isolated *Pseudomonas savastanoi* [cf. **36**, p. 200], inoculations with which into 2-yr.-old potted Moresca olive plants gave rise to similar formations from which the organism was re-isolated.

Ciccarone (A.). **Nuovi parassiti dell' Olivo e del Mandorlo.** [New parasites of Olive and Almond trees.]—*Ital. agric.*, **96**, 3, pp. 202–204, 4 fig., 1959.

A brief note is given on *Elsinoë oleae* Ciccarone & Graniti, which in Sicily attacks all green parts of the olive tree, including the fruits. The lesions are easily overlooked, as they are very minute, and on the leaves they appear only on the rachis, the under surface, and the stalks. They are dark or black, raised above the surrounding tissue, and because they wrinkle or split radially (on the fruits) or longitudinally (on the rachis, leaf stalks, and buds) they look like small cankers. As long as they are green and remain attached to the tree, infected leaves bear under the epidermis only the imperfect state, *Sphaceloma oleae*; but after they have fallen, *E. oleae* develops. The fungus is rather widespread locally.

A new fungus, *S. siculum* Ciccarone, parasitic on the leaves of Mollese almond trees growing near Palermo, is reported. It appears to be the most prevalent fungus, locally, on the green parts in summer.

Maier (C. R.). **Streptomycin absorption and translocation by Hops (Humulus lupulus L.), and effects of streptomycin on the Hop downy mildew disease.**—*Diss. Abstr.*, **19**, 12, p. 3097, 1959.

Further details are given of tests at Oregon State College on streptomycin absorption by hop plants [**37**, p. 103], which was 6·06% from sprays and 4·15% from lanolin paste, but negligible from the soil. Peak concs. attained with foliar sprays were proportional to the conc. used, levels of 224 p.p.m. being retrieved after sprays of 2,000 p.p.m., and 133 p.p.m. following lanolin mixtures; later there was a sharp decline. Although no downward translocation occurred in the greenhouse, upward translocation was at 4 cm./min. for sulphate applications and 4·2 for nitrate. In field-treated hops the uptake and period of retention were greater than in the greenhouse, and this was enhanced by a further spray (1,000 p.p.m.) 16–21 days later.

Min. systemic conc. of streptomycin effectively reducing secondary infection by *Pseudoperonospora humuli* [cf. **38**, p. 535] was 12–19 p.p.m., and 46–69 p.p.m. were effective for eliminating established infection. In the field streptomycin reduced the number of systemically infected shoots produced, retarded sporulation, and induced recovery and normal growth of systemically infected vines. Microscopic examination of treated infected hops showed abnormalities in, and reduction of, systemic hyphae in the pith and cortex, absence of hyphae in the growing tips, their reduction in lateral shoots, distorted sporangiophores with few sporangia, and reduction in zoospore formation, viability, germination, and germ tube growth.

Varadarajan (P. D.). **A new species of Oidium on Rauwolfia serpentina.**—*Curr. Sci.*, **28**, 5, pp. 205–206, 1959.

O. rauwolfi Varadarajan was found on leaves in the greenhouse of the Morriss Arboretum, Philadelphia. Other *R.* spp. present were not attacked. Conidia were 25·5–34·5 × 13·5–19·5 μ, borne singly. Weekly dusting with S for 6 weeks brought the disease under control.

Hoestra (H.). **La maladie de Kaincopé.** [The Kaincopé disease.]—31 pp., 1 diag., 1 map, Paris, Institut de Recherches pour les Huiles et Oléagineux, 1959. [Cyclostyled.]

Previous investigations of this and allied diseases of coconuts [**38**, pp. 23, 326] in French Togoland and elsewhere are reviewed and an extensive series of experiments and observations in Togoland is described in detail. The cause of the disease still remains undiscovered, but from published descriptions the author considers it to be similar to the 'unknown disease' (lethal yellows) of the Caribbean area rather than to bronze leaf wilt, and to a like condition which has recently been

described from Mozambique. Though no definite conclusion can be reached, he considers that the weight of evidence points to a virus as the cause.

Pandalai (K. M.), Sankarasubramoney (H.), & Menon (K. P. V.). **Studies on soil conditions in relation to the 'root' and 'leaf' diseases of the Coconut palm in Travancore-Cochin. Part IV. Total and exchangeable calcium and magnesium contents of Coconut soils.**—*Indian Cocon. J.*, **11**, 2, pp. 49–66, 1958. [28 ref.]

Investigations at the Central Coconut Research Stations, Kasaragod and Kayangulam [cf. **33**, p. 294; **38**, p. 311], showed the total Ca content and the values for total exchangeable bases to be lower in soils with diseased palms than in the healthy areas. Although the lack or non-availability of nutrients in soil is connected with Mg, the role of the latter in palm diseases is not yet definite. The authors emphasize the need for a systematic observational trial on Ca, K, and Mg fertilization in relation to palm diseases.

Johnston (A.). **Oil Palm seedling blight.**—*Malay. agric. J.*, **42**, 1, pp. 14–20, 4 pl., 1959.

This disease, 1st observed in 1952 [cf. **33**, p. 523], but now widespread in Malaya, is of sporadic occurrence. It causes retardation of growth and stunting, death of the worst affected seedlings, and may result in an unexpectedly high loss of seedlings in the nursery. The 1st symptoms are minute, round, translucent, yellow spots on both surfaces of the leaf, developing light brown, slightly depressed centres. The spots become darker brown, irregular in shape, slightly elongated along the leaf axis, and each is surrounded by a well-defined, narrow, translucent yellow halo outside a narrow, raised, greenish-brown, oily-looking rim. Within, a reddish-brown region shows 1 or 2 roughly concentric lesser ridges and the centre of the spot is thin and light brown or fawn. Isolated spots, when fully developed, may be up to 7–8 mm. in length. The youngest unfolding leaves are most susceptible to infection, and leaf resistance increases with age. In the case of light attack the spots remain discrete, but in severe outbreaks they coalesce and cause the premature death of the leaves. Plants are most susceptible in the 1st few months after transplantation into the nursery; by the time of field planting they are immune. The causal organism was shown to be a sp. of *Curvularia* [**37**, p. 8] resembling *C. maculans*, spores 20–27 × 12·5–14 (24 × 12) μ.

Significant decrease of the disease was obtained by spraying with fungicides containing thiram and zineb, and spraying with captan and zineb resulted in an increase in frond length, but the general level of disease in this trial was low.

Fisken (A. G.). **Factors affecting the spread of aphid-borne viruses in Potato in eastern Scotland. I. Overwintering of Potato aphids, particularly Myzus persicae (Sulzer). II. Infestation of the Potato crop by Potato aphids, particularly Myzus persicae (Sulzer).**—*Ann. appl. Biol.*, **47**, 2, pp. 264–273, 1 graph, 1 map; pp. 274–286, 2 graphs, 2 maps, 1959. [18 and 15 ref.]

These papers present the results of a survey started by the Scottish Horticultural Research Institute, Dundee, in 1953 to ascertain how potato aphids, particularly *M. persicae*, overwinter in E. Scotland, to follow the course of potato infestation in different areas, and to attempt correlation with the time and rate of spread of aphid-borne potato viruses in the crops. Observations were made in Midlothian (1953–6), Angus and Perthshire (1954–6), and Moray (1956) to assess the relative importance of peaches, glasshouses, heated frames, root clamps, and brassica crops as sources of aphids.

In the 1st paper, it is stated that 3 spp. of potato aphids, *M. persicae*, *Macrosiphum euphorbiae*, and *Aulacorthum solani*, overwinter in E. Scotland, primarily

as apterae on perennial, glasshouse, frame, and brassica crops. Brassica crops are the commonest hosts of overwintering *Myzus persicae*, the chief vector of potato leaf roll and Y viruses, and these crops are concentrated in the market-gardening areas of the Lothians and Moray. Although crops of savoy cabbage and Brussels sprouts often carried numerous *M. persicae*, spring cabbage, cabbage for seed, and broccoli appeared to be the most important overwintering hosts, as they generally persist until mid-May, thereby allowing the dispersal of the alatae to spring-planted crops. Many alatae dispersed during July and Aug. from crops colonized in spring. Although *M. persicae* overwintered as eggs on peach and viviparously on plants in glasshouses, the influence of such sites was merely local. Unless numerous individuals of *M. persicae* survive the winter on weeds, the market-garden area of the Lothians is probably the main source from which this aphid colonizes potato crops.

In the 2nd paper the evidence of surveys of potato crops in 1954–6 is dealt with. This showed that in most areas they were infested by *M. persicae*, *Macrosiphum euphorbiae*, and *Aulacorthum solani*. Crops in different localities became infested by *Myzus persicae* at different times and to various degrees, and these differences appeared to remain consistent over the period. Crops near Edinburgh were colonized between mid-May and mid-June, whereas those in N. Perthshire escaped infestation until the end of July or mid-Aug. The time and degree of infestation by *M. persicae* appears to be correlated with distance from the sites where the aphid overwinters. Trap records showed that many late *M. persicae* disperse from outdoor brassica and early potato crops near Edinburgh between mid-July and mid-Aug., when potato crops in Fife, Angus, and Perthshire usually become infested. The freedom of crops in the better seed-producing areas from widespread infection by potato leaf-roll virus and virus Y is probably associated with lateness of aphid infestation rather than with scarcity of vectors.

Ramson (A.). **Untersuchungen über die Beziehungen zwischen Witterung und Nachbauwert der Kartoffeln.** [Experiments on the relationships between weather and Potato progeny value.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **13**, 3, pp. 46–55, 1 fig., 1959. [Russian and English summaries. 37 ref.]

During 1951–56 serial experiments were made at the Kleinmachnow experimental fields by the Biologische Zentralanstalt, Berlin, to determine the place of the weather factor in relation to virus diseases in potatoes, and to ascertain the relationship between weather, aphid vectors, and the health of the progeny. Average atmospheric temp. and rainfall in May–Sept. appear suitable for use in prognosis, the weather conditions in June and July being of special significance. Individual weather factors are inadequate without reference to development and numbers of vectors.

Wenzl (H.). **Zur Diagnose der Viren der Mosaikgruppe in Kartoffelsaatgut nach Martin–Quemener.** [On the diagnosis of viruses of the mosaic group in seed Potatoes according to Martin–Quemener.]—*PflSchBer.*, **22**, 6–7, pp. 81–92, 2 fig., 1959. [English summary. 17 ref.]

From the Bundesanstalt für Pflanzenschutz, Vienna, it is reported that, in conformity with the findings of Martin and Quemener [**35**, p. 784], virus Y infection in Bintje potatoes was indicated with a high degree of certainty by the irregular spotting on sprouts from tubers germinated in the dark and subsequently exposed to diffuse sunlight. Healthy and infected tubers of a number of other vars. could not be distinguished so readily.

Arenz (B.) & Hunnius (W.). **Der Infektionserfolg bei Blattroll- und Y-Virus in Abhängigkeit vom Infektionszeitpunkt und von der Abwanderungsdauer.** [The

occurrence of infection by leaf roll and virus Y in relation to the time of infection and the duration of movement.]—*Jb. bayer. Landw.*, **36**, 1, pp. 18–36, 1959.

In further glasshouse studies from the Landessaatzuchtanstalt, Weihenstephan [**36**, p. 418], 2 series of tests were carried out involving varied dates of infection with leaf roll virus and old strains of virus Y and a single harvest date, and a single infection date followed by varied harvest dates, with the potato vars. Maritta (fairly resistant to both viruses) and Ackersegen (more susceptible). In a series of infections with each virus there was a recession of the spread of the disease up to flowering time, considered to be caused by changes in the plant in passing from the vegetative to the reproductive phase. On the basis of the increase in the speed of infection with increasing age, accompanied by simultaneous decrease of the infection effect (measured by the no. infected haulms and the proportion of diseased tubers/infected haulm), hypersensitivity is indicated as the cause of age resistance, which appears to be very typical. Leaf roll virus spread more rapidly in the plant than virus Y, which required twice as long to reach the tuber in Maritta as in Ackersegen. Yield could not be influenced by primary infection. The success of early lifting in Maritta and Ackersegen differed according to the virus, and the date giving the best results is clearly related to both virus and var.

Arenz (B.) & Hunnius (W.). **Der Einfluß verschiedener Virusarten auf die Ertragsbildung bei der Kartoffel.** [The influence of different kinds of viruses on Potato yield.]—*Jb. bayer. Landw.*, **36**, 2, pp. 163–173, 1959.

In further experiments [see above] in the spring of 1958 pot tests were made in the open with tubers from plants which in the previous year under the same conditions were subjected to controlled infection with potato leaf roll and virus Y (both non-necrotic and tobacco vein browning strains). Infection was confirmed by the eye test, serology, and inoculation. Leaf roll virus retarded germination and maturation. The time and degree of disease development and its influence on yield depended on the var.; with an av. loss of 40·3% (25 vars.), the losses for the individual vars. ranged between 100 and 1·2%. The 'old' Y strains caused a slight acceleration of growth and very early dying off, symptoms again being closely related to the var. In addition to complete latency, mild mosaic, crinkle mosaic, and raspberry leafing with streak and ink-spot necroses were observed. Of the viruses examined, the 'old' Y strains caused the highest losses (50·5%) with a variation according to var. of 83·3–6·4%. The tobacco vein browning strains exerted no significant influence on germination and maturation; a tendency to latency predominated, symptoms including mild mosaic, crinkle, and spoon leaf formation. Av. loss of yield was 13·8% for vars. with latent infection and 20·6% for those with symptoms.

Heie (O.). **Bladlus fra fangbakker i Danmark. I. Ferskenbladlus (Myzus persicae Sulzer) i 11 bakker opstillet ved Kartoffelparceller i virussmitteforsøg 1953–56.** [Aphids from traps in Denmark. I. The Peach aphid (*M. persicae*) in 11 traps set on Potato plots in virus infection experiments 1953–56.]—*Tidsskr. Planteavl*, **62**, 5, pp. 879–900, 1 fig., 2 graphs, 1959. [English summary.]

The max. number of aphids trapped between Apr. and Oct. 1953 in various localities under the supervision of the State Phytopathological Station was 81/week, of which *M. persicae* constituted 13·3% from 1 June to end of Sept. In general, the flight to the yellow traps described by Moericke in *NachrBl. dtsch. PflSchDienst, Stuttgart*, **3**, pp. 23–24, 1951, began early in July on the islands and during the latter part of the month in Jutland.

The catches in June and the 1st half of July were very numerous in 1954, the peak being reached 7–14 days earlier on the islands (max. 4,835/week) than in

Jutland, but from the 7th to 23rd week *M. persicae* accounted for only 0·3% of the total. On potato leaves, however, 272 individuals/100 were counted in one place on 29 July and 338 on 26 at another.

In 1955 flights started late, culminating about 25 Aug. with a max. of 6,674 aphids/week. *M. persicae* constituted 2·1% of the catches from the 7th to 23rd week, reaching a max of 79/week during the 2nd half of Aug. Numbers were comparatively small in 1956, when the main flights occurred between mid-July and the beginning of Sept. (max. 2,097/week). *M. persicae* represented 2·4% of the total from the 7th to the 23rd week. The principal source of *M. persicae* trapped during this survey was potatoes, swedes, and other summer hosts.

Kameraz (A. Y.) & Shcherbakova (Mme N. M.). Определения вирусов Картофеля С и Х. с помощью серологических 'микрореакций'. [The identification of Potato viruses C and X by means of serological 'microreactions'.]—Бюлл. всесоюз. Ин-та Растениевод. [*Byull. vsesoyuz. In-ta Rastenievod.*], *1957*, 4, pp. 11–15, 1958. [Abs. in *Referat. Zh. Biol.*, *1959*, 11, pp. 58–59, 1959.]

A simplified form of van Slogteren's serological micro method [cf. **36**, p. 117; **37**, p. 137] was used to test potato virus X with Dutch serum and serum of home origin; 3–4 uppermost leaves before flowering were employed. Viruses C [potato virus Y str.] and X were not detected in any plant of the 25 seed potatoes of selected vars. studied (the viruses are not tuber transmissible). As the number of years of tuber reproductions increases, viruses C and X begin to spread widely. Virus C was detected in 64 of 80 potato vars. but was not found by the authors in their experiments on the Soviet vars. Vyrypaevskiĭ, Korenevskiĭ, and Ruslan. Virus X was found in 190 of 200 vars. The presence in some vars. of a limited number of virus-free plants offers prospects for the selection of virus-free seed tubers.

Eddins (A. H.). **Susceptibility of Potato varieties and seedling selections to corky ringspot.**—*Amer. Potato J.*, **36**, 6, pp. 187–190, 2 fig., 1959.

In these trials, reported from the Potato Investigations Laboratory, Hastings, Florida, 20 potato vars. and 33 U.S.D.A. seedling selections were examined for susceptibility to corky ringspot [spraing] virus [cf. **37**, p. 501] by growing them in infected soil. B 294–65, B 313–21, B 606–3, B 721–1, B 3013–5, Boone, and Delus remained free from symptoms, and tuber infection did not exceed 0·9% in B 505–75, B 936–12, Merrimack, Saco, and Pungo in the 3–8 yr. they were tested, while in the most susceptible vars. Kennebec, Red Pontiac, and Sebago, max. tuber infection was 55·4–74%. Of these resistant vars. and selections, Merrimack, Pungo, and Plymouth have proved the most suitable for commercial production in infected fields [**38**, 708].

Ullrich (J.). **Die Prüfungen von Kartoffelsorten und Kartoffelzuchtstämmen auf Resistenz gegenüber den Biotypen des Kartoffelkrebserregers (Synchytrium endobioticum).** [The testing of Potato varieties and breeding strains for resistance to biotypes of the agent of Potato wart (*S. endobioticum*).]—*NachrBl. dtsch. PflSchDienst, Stuttgart*, **11**, 1, pp. 10–12, 1 fig., 1959.

An account of the work of the Institut für Botanik, Brunswick, in testing potato breeding strains for resistance to the 5 biotypes of *S. endobioticum* encountered in the German Federal Republic [cf. **37**, p. 502; **38**, p. 274]. The resistance of a number of commercial vars. to these biotypes is tabulated. It has been found necessary to scrape the tubers free from sclerotia of *Rhizoctonia* [*Corticium*] *solani* before testing.

Dorozhkin (N. A.) & Gorlenko (S. V.). Агротехнические способы борьбы с Картофельным раком. [Agrotechnical measures for the control of Potato wart disease.]—35 pp., 8 fig., 'Zvyazda', Minsk, 1958. [Received Aug. 1959.]

This booklet was compiled with the assistance of specialists after a detailed investigation in the White Russian Republic, where since 1956 more than 70 districts with more than 54,071 ha. potatoes have taken measures against potato wart [*Synchytrium endobioticum*: see below]. There are 12 resistant vars. in general use but the disadvantage of planting these in infested areas is pointed out. Recommendations include summer sowing, fallowing, crop rotation, and the use of clover and lupins as green manure.

Khizhnyak (P. A.) & Sazonik (Кн. V.). О действии кожэмульсии на возбудителя рака Картофеля в почве. [On the action of 'leather' emulsion on the causal agent of Potato wart in the soil.]—Защ. Раст., Москва [*Zashch. Rast., Moscow*], **4**, 3, p. 49, 1959.

As an alternative to chloropicrin for soil disinfection against potato wart [*Synchytrium endobioticum*: **38**, pp. 419, 618, and above] tests were made of a 20% aqueous solution of 'leather' emulsion, a by-product of the petroleum industry, consisting of mineral oil of a high degree of purity in an aqueous solution of sodium naphthenate and sulphonaphthenate (used in the tanning industry as a substitute for grease in leather greasing). In 1956 plots (100 sq. m.) which had carried a susceptible potato var. (78–80% infected plants) in the preceding 2 yr. were steamed in the summer to free the soil from germinating spores. After digging to a depth of 18–20 cm., the soil was uniformly watered on 21 Aug. with the emulsion (containing 20·81% sulpho-sodium salts, 58·5% mineral oil, 0·19% free caustic soda, and 20·5% water and used at 1 l./ha.), which was then thoroughly mixed in to a depth of 15–18 cm. In the spring of 1957 mineral fertilizers were added and a wart susceptible var. planted on $\frac{1}{4}$ of each plot, maize being raised on the remaining area. In 1957 and 1958 the plants on the treated plots were not infected by wart, though 9–29% of the untreated were infected. Separate tests showed that soil treatment with the emulsion (10 tons/ha.) had no adverse effect on various fruit tree seedlings, nor did it reduce the fertility of the soil. Its cost is $\frac{1}{10}$ that of chloropicrin.

Hyre (R. A.). **The relation of rainfall and temperature to late blight of Potato at Burlington, Vermont.**—*Plant Dis. Reptr*, **43**, 3, pp. 295–297, 1 graph, 1959.

Studies by the U.S. Dept Agric. and the University of Delaware, Newark, concerned the analysis of data concerning the relationship of weather to outbreaks of *Phytophthora infestans* in Vermont, 1891–1910, by the moving graph method [**37**, p. 53]. General agreement was obtained with studies recently made in Maine [**38**, p. 618], indicating the probable value of the method for most of the N.E. United States.

Feddersen (H. D.). **Late blight of Potatoes.**—*J. Agric. S. Aust.*, **62**, 11, pp. 496–499, 5 fig., 1959.

This popular account of the control of *Phytophthora infestans*, which occurs throughout the Adelaide Hills [cf. **36**, p. 782], recommends spray mixtures and enumerates the precautions to be taken at harvest and in storage of a blighted crop, and those necessary to prevent a subsequent outbreak.

Olofsson (B.) & Andrén (F.). **Försök rörande förebyggande besprutning mot Potatisbladmögel 1958.** [Experiments relating to preventive spraying against Potato blight 1958.]—*Växtskyddsnotiser, Stockh.*, **22**, 5–6, pp. 73–79, 1959.

In comparative 4-plot trials of Cu (cuzol 0 and Bordeaux mixture) and zineb (De Zäta 78) sprays (3, 4, or 5 applications) against blight [*Phytophthora infestans*] on

Up-to-Date in various localities of central and S. Sweden [**38**, p. 27], the former at a dosage of 3 kg./ha., gave better control in 2, and the latter in another 2. Tuber rot was more prevalent in the zineb-treated plots. Combinations of the 2 types of fungicide produced the max. yield, exceeding the unsprayed plots by 24 and those treated with either alone by 6%. There was little difference in efficiency between 4 or 5 treatments but the results of only 3 were distinctly inferior.

In a series of 10 field tests, using tractors and including vitigran in addition to the above-mentioned Cu sprays, the latter gave better av. results against blight in 5 and against tuber rot in 8. Three treatments were generally insufficient, and in the south even 4 failed to halt the progress of the fungus, since the active principle was largely washed off by rain. Effective protection can be ensured, therefore, only by paying due attention to the weather. Zineb preparations would appear to be more suitable for early, and those containing Cu for later, treatments, compounds of the latter group being both more adhesive and exerting a stronger action against tuber rot.

Blair (I. D.). **Loss and damage in Potatoes.**—*Tech. Publ. Canterbury agric. Coll.*, 18, 23 pp., 8 pl., 1959. [23 ref.]

This survey of the harvesting and transport of the potato crop in Canterbury, New Zealand, deals, *inter alia*, with the loss caused by scab (*Streptomyces scabies* [**31**, p. 319]), blight (*Phytophthora infestans* [**38**, p. 28]), and pink rot (*P. erythroseptica* [**34**, p. 214]), which severely affect at least $\frac{1}{3}$ of the crops in the area. Scab is severe on soils of high pH, deriving from high liming for grass crops before the potatoes. In 1956 and 1957 22 and 34%, respectively, of inspected crops had blight, with an average loss of 11% in 1957. Incidence of blight is very variable. In general, however, Aucklander Tall Top, Glen Ilam, Iron Duke, Sebago, and Arran Consul are the least affected, and King Edward and Chippewa the most. When lupins are ploughed in as green manure before potatoes, blight tends to be less. The sporadic appearance of blight militates against regular spraying practices, but these could probably be used more often with advantage. Pink rot is prevalent in the Willowbridge district of S. Canterbury and partial control is obtained with Cu oxychloride, 100 lb./acre.

Bazán de Segura (C[onsuelo]). **Observations on Potato diseases in Peru.**—*F.A.O. Pl. Prot. Bull.*, **7**, 7, pp. 99–100, 1959.

Much of this information has already been noticed [**35**, p. 917; **38**, p. 28]. Wilt caused by *Verticillium alboatrum* [**36**, p. 421], at first attributed to *Fusarium oxysporum*, is serious on the var. Hirasahuasi in the Central Valley and is also the main disease in the coastal area. Less important pathogens include *Alternaria solani*.

Hoffman (G. M.). **Untersuchungen zur physiologischen Spezialisierung von Streptomyces scabies (Thaxt.) Waksman et Henrici.** [Studies on physiologic specialization in *S. scabies*.]—*Zbl. Bakt.*, Abt. 2, **112**, 11–15, pp. 369–381, 3 fig., 1959.

Further studies at the Institut für Phytopathologie, Aschersleben, Germany, on 211 cultures from 67 potato vars. revealed clear-cut differences between them [**33**, p. 556; cf. **34**, p. 670]. There were, for example, 17 which produced no diastase and others varying in the degree of pigmentation on tyrosin-containing media and the tendency to break down casein. The results of 2-yr. inoculation experiments with 15 isolates on Frühmolle, Aquila, and Sabrina formed a basis for the differentiation of 3 groups, the 1st comprising 8 strongly, and the 2nd 4 moderately aggressive isolates, while the remaining 3 weakly aggressive were assigned to the 3rd. Each of these groups contained diastatically inactive strains, demonstrating that changes in physiological characters are not necessarily accompanied by loss of virulence.

KLINDIĆ (OLGA). **Prašna krastavost Krompira-Spongospora subterranea (Wallr.) Lagerh.** [Powdery scab of Potato—*S. subterranea.*]—*Poljopr. pregl.*, **6**, 9–10, pp. 427–431, 1957. [Abs. in *Referat. Zh. Biol.*, *1959*, 10, p. 215, 1959.]

Infection has been observed in several distinct areas in Yugoslavia. Taking into account the wide dissemination [map 34] it is probable that the disease was present in the country previously. A description is given of the symptoms, morphology, and biology of the causal agent, and control measures.

HARRISON (D. E.). **Phoma or gangrene of Potato in Victoria.**—*J. Dep. Agric. Vict.*, **57**, 6, pp. 381, 383–385, 387, 389, 8 fig., 1959.

Although *P. foveata* [map 211; cf. **32**, p. 504] disease is now recognized as having caused serious losses (20–30% in 1957–8) in stored potatoes in Victoria since 1953 or before, this appears to be the 1st record for Australia. Full details are given of the disease and its control. The fungus was determined in 1956 by S. C. Chambers (M.Sc. Thesis, University of Melbourne).

HILDEBRAND (E. M.). **A whitefly, Trialeurodes abutilonea, an insect vector of Sweetpotato feathery mottle in Maryland.**—*Plant Dis. Reptr*, **43**, 7, pp. 712–714, 1959.

Further studies by the U.S. Dept Agric. [cf. **38**, p. 31] have shown *T. abutilonea* to be a natural vector of the feathery mottle virus. The insect breeds on *Abutilon theophrasti*, a weed often adjacent to sweet potato, and abandons it as it seeds in late summer. Variability in transmission efficiency (0–100%) is attributable to the intricate life-history of the vector and to variations in the response of the host to inoculation, successful transmission only occurring when essential factors are synchronized. [This information is also abs. in *Phytopathology*, **49**, 8, p. 524, 1959.]

CHONA (B. L.). **Presidential address. Some diseases of Sugarcane reported from India in recent years.**—*Indian Phytopath.*, **11**, 1, pp. 1–9, 1958.

In this address to the Indian Phytopathological Society in Jan. 1958, notes are given on the symptoms, causal organisms, geographical distribution, and control of sugarcane diseases which have been either recently reported from India [**36**, p. 212] or have assumed major importance there [loc. cit.; **38**, p. 33], including mosaic virus [**34**, p. 517]; albinism (cause unknown); spike disease (suspected virus) [**37**, p. 57]; twisted top, the symptoms of which resemble the mechanical 'tangle top' [cf. **33**, p. 590], but the cause of which, in India, has not yet been determined; redstripe (*Xanthomonas rubrilineans* [**36**, p. 127]); red rot of the leaf sheath (*Sclerotium rolfsii*) [**36**, p. 275]; yellow leaf spot (*Cercospora kopkei*) affecting the main var. Co. 419 in S. India; *Leptosphaeria sacchari* leaf spot [**34**, p. 517], severe in Andhra (coast) and Talaparemba; top rot (*Fusarium moniliforme*) [*Gibberella fujikuroi*: cf. **37**, p. 419; **38**, p. 185]; and seedling blight (*Pythium graminicola* [**38**, p. 422], *P. aphanidermatum*, and *P. catenulatum* [cf. **36**, p. 127], occasionally with *Rhizoctonia* [*Corticium*] *solani*).

Indications of the presence of a new, virulent strain of sugarcane mosaic virus causing severe mosaic and yellowing in Co. 527 in the Nellikuppam (S. Arcot, Madras) area were obtained; a virulent strain was reported also from the Punjab, affecting Co. 313. Pathogenicity tests showed that *P. graminicola*, *P. aphanidermatum*, and *C. solani* are all able to cause severe rootrot of sugarcane seedlings. The disease was controlled by heat sterilization of the soil and by post-emergence drenching of the seedlings with various fungicides, of which Cheshunt compound appeared to be the best.

ADSUAR (J.). **Present status of Sugarcane disease studies in Puerto Rico.**—*Sug. J.*, *N. Orleans*, **23**, 1, pp. 51–52, 1959.

The high degree of susceptibility of var. B.34104 to sugarcane mosaic virus,

predominantly strain B [**35**, p. 489; **37**, p. 373], is contributing to its gradual elimination. Chlorotic streak virus [loc. cit.], particularly severe on the widely grown var. P.O.J.2878 (some 49% of the cane acreage), may be combated by 20 min. immersion of the seed pieces in hot water (52° C.); an increase of about 45% in sugar production resulted from the planting of sound as compared with diseased material. It has been demonstrated by recent studies at the Rio Piedras Experiment Station that direct contact between healthy and infected roots growing in nutrient solution in the same container can cause infection, while transmission of the virus may even be effected by circulation of the solution without actual contact [cf. **38**, p. 625].

Ratoon stunting virus [**35**, p. 43] is also controllable by immersion in hot water (50°) for 2 hr. or exposure to hot air (58°) for 8.

Abbott (E. V.). **Importance of mosaic in present commercial varieties of Sugarcane in Louisiana.**—*Sug. Bull., N. Orleans*, **37**, 15, pp. 179–181, 1959.

The increasing prevalence of sugarcane mosaic virus, especially in the Bayou Lafourche and lower Mississippi Valley areas, is attributed to the release of susceptible vars. and the development of a strain capable of infecting such normally resistant vars. as C.P.44–101 [**38**, p. 277]. The reductions in cane/acre in 3 crops (2 plant cane, 1 1st stubble) of 1957–8 were estimated for N.Co.310 at 76·3 tons (14·3%), for C.P.44–101 at 55·7 (28·8), and for C.P.52–68 at 46·4 (33). The percentages of infection developing during 1956–58 in originally healthy plots of plant cane were as follows: N.Co.310, 47, 9, and 32; C.P.44–101, 22, 10, and 5; and C.P. 52–68, 30, 16, and 8, the corresponding figures for the 1st stubble being trace, 59, and 32, trace, 32, and 23, and nil, 43, and 18, respectively.

Previous recommendations for roguing [loc. cit.] are recapitulated. In general, the operation should be limited to fields of plant cane with a max. of 2% infection.

Dean (J. L.) & Coleman (O. H.). **Necrotic and resistant reactions to the Sugarcane mosaic virus, in Sorghum.**—*Plant Dis. Reptr*, **43**, 5, pp. 522–527, 5 fig., 1959.

At the U.S. Sugar Crops Field Station, Meridian, Mississippi, systemic necrotic symptoms observed on sorghum were found to be caused by sugarcane mosaic virus, though distinct from the usual mottling. The reaction of 72 sorghum vars. inoculated was rated as 'mottle', 'necrotic', or 'resistant', resistance being implied when appearance of mottling was delayed in some by at least 1 week and only a very mild mottle developed. Resistance appears to be rarer in sorghum than sugarcane, but Wiley and MN2046 showed a considerable degree, all symptoms disappearing within a few days. Inoculation with different strains of sugarcane mosaic virus resulted in but little difference in symptoms on individual vars. The 'red streak' of sorghum reported in Italy by Lovisolo [**37**, p. 232] is considered by the authors to be a necrotic reaction to sugarcane mosaic virus.

Orian (G.). **Une maladie du Théier et d'autres plantes causée par un champignon à propagules.** [A disease of Tea and other plants caused by a gemmiferous fungus.]—*Rev. agric. Maurice*, **38**, 1, pp. 21–24, 1 pl., 1959.

In 1949 a gemmiferous fungus was found to cause a disease on loquat [cf. **31**, p. 538]. In 1956 and 1957 similar symptoms were observed causing severe defoliation of young tea plants in the same area, Curepipe, and affecting *Tabebuia rosae* trees in the vicinity. *Cassia aurea* and *Bombax* sp. were also affected slightly. Subsequently in the Botanic Garden of Curepipe 13 more plants and trees, which are listed, were found to be attacked by the fungus. The fungal propagules varied in size not only on different spp. but on the same plant, max. and min. dimensions being 0·28–1·23 × 0·05–0·56 mm.

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CONTENTS

AUTHORS' NAMES

Abbott, 768
Adsuar, 767
Agarwal, 729
Allen, 706
Andrén, 765
Anselme, 747
Arenz, 762, 763
Armstrong, G. M., 732
Armstrong, J. K., 732
Baker, 741
Bakshi, 721
Ballard, 722
Ban, 729
Barksdale, 706
Barmenkov, 733
Barnes, E., 754
Barnes, G. L., 719
Bartlett, 729
Baskett, 721
Batrak, 727
Bazán de Segura, 766
Beck, 726
Beke, 739
Bel'tyukova, 731
Bereznegovskaya, 730
Beskina, 734
Bier, 726
Bilgrami, 759
Bilýk, 727
Bird, 746, 747
Blackmon, 747
Blair, 766
Bloomberg, 720
Bogovik, 739
Bohovýk, 732, 740
Borges, 709
Boyce, 721
Brase, 706
Brierly, 748
Briggs, 707
Britton, 752
Broadbent, 735
Brook, 755
Burton, 725
Cadman, 758
Caltrider, 726
Čapková, 730
Caporali, 756
Cation, 707
Chant, 726
Chiu, 751
Chona, 767
Choudhury, 721
Christensen, E. V., 751
Christensen, J. J., 736
Ciccarone, 757, 760
Coleman, 768
Corbett, 745
Cormack, 753
Cotter, 736
Cowling, 721
Cralley, 742, 753
Crosier, 731
Crossan, 710
Crosse, 757
Cummins, 752
Curl, 752
Daftsios, 754
Daleia, 742
Dean, 768
De Fossard, 744
Desai, 742
deZeeuw, 725
Dickson, 746
Diener, 706
Dorozhkin, 765
Dutta, 724
Earhart, 739
Eddins, 708, 764
Eide, 710
Ellett, 738
Engelbrecht, 742
Feddersen, 765
Feldman, 708
Ferreira, 709
Finley, 724
Fisken, 761
Flores, 733
Frank, 730
Frazier, 758
Friday, 707
Geard, 725
Gill, 720
Golub, 731
Gorlenko, 765
Graniti, 758
Grasso, 739
Gualaccini, 718
Guthrie, 710
Hammarlund, 728
Hansen, J. D., 752
Hansen, S. E., 709
Harding, 743
Hardison, 753
Harrison, 767
Hartwig, 724
Hassebrauk, 737
Hastie, 708
Heie, 763
Henderson, 716
Henry, 742
Herold, 730
Hildebrand, 767
Hilton, 711
Hoestra, 760
Hoffman, G. M., 766
Hoffman, J., 730
Huber, 724
Hunnius 762, 763
Hyre, 765
Inman, 750
Jacks, 723
Jančařík, 719
Janick, 708
Jensen, D. D., 734
Jensen, S. G., 722
John, 726
Johnson, 738
Johnston, A., 761
Johnston, T. H., 742
Josifović, 751
Jylkka, 718
Kachalova, 738
Kale, 708
Kameraz, 764
Karle, 706
Karling, 707
Katsuki, 741
Keep, 707
Kemp, 730
Kenaga, 721
Khizhnyak, 765
Kienholz, 756
Kingsland, 740
Király, 738
Kirchner, 749
Kiso, 743
Klement, 727
Klindić, 767
Llingner, 708
Knight, 707
Knutson, 710
Kosswig, 754
Kramer, 743
Kublanovskaya, 747
Kuc, 754
Kulikovskaya, 731
Lachmann, 732
Laird, 746
Lakshmanan, 743
Latch, 751
Leach, 753
Leaphart, 720
Lebeau, 753
Lelley, 738
Levisohn, 716
Line, 710
Linn, 721
Lockwood, 722
Lorentz, 748
Lott, 707
Lovas, 727
Lovisolo, 707
Lupinovich, 731
MacLeod, 750
Maier, 760
Maloy, 723
Martelli, 759
Marton, 739
Mathur, 708
Matthysse, 747
Matuo, 718
McClean, 742
McClure, 710
McCubbin, 708
McGrew, 707, 758
Meier, 721
Melikova, 726
Melitskiĭ, 755
Menon, 761
Mihatsch, 753
Milbrath, 756
Miller, P. M., 758
Miller, P. W., 720
Mizukami, 742
Moericke, 709
Moffatt, 753
Moreau, 744
Mortensen, 725
Müller, 709
Muller, 746
Myers, 752
Natti, 723
Nečásek, 730
Neitzel, 709
Nelson, 749
Neustadt, 741
Niegolewski, 710
Nyland, 705, 706
Olofsson, 765
Olsson, 755
Orian, 768
Ota, 746
Overlaet, 736
Pagano, 730
Pan, 739
Pandalai, 761
Pansy, 730
Panzer, 753
Parker, 706
Patel, 742
Patino, 722
Pavlenko, 755
Phelps, 718
Plakidas, 748, 749
Poshradszky, 741
Pohjakallio, 739
Polishchuk, 727
Pontis, 708
Pourtet, 720
Prasad, 708
Prentice, 747
Pridham, 730
Protsenko, A. E., 734
Protsenko, E. P., 750
Radman, 705
Raeuber, 709
Ramazanova, 752
Ramson, 762
Rangaswami, 743
Rao, 743
Rawald, 729
Roberts, 736
Rogers, 721
Rojecka, 756
Roland, 748
Rotmistrov, 731
Runnels, 749
Saksena, 751
Salonen, 739
Sankarasubramoney, 761
Sayre, 722
Sazonik, 765
Schmid, 706
Schneider, C. L., 722
Schneider, I. R., 723
Schoenweiss, 718
Schuster, 722
Scott, 707
Seeman, 709
Sequeira, 745
Setty, 759
Sharpe, 730
Shcherbakova, 764
Sheffield, 746
Shoji, 746
Silberschmidt, 733
Sill, 751
Silva, 745
Singh, B., 721
Singh, B. B., 751
Singh, R. D., 708
Sinha, 742
Stapel, 752
Stewart, 736
Stoddard, 758
Stover, 758
Südi, 741
Šutić, 751
Swenson, 749, 756
Szirmai, 725
Tandon, 759
Taylor, 754
Terekhova, 727
Thomas, C. A., 708
Thomas, H. E., 705, 758
Thomas, M. H., 739
Tollenaar, 735
Tsekhomskaya, 755
Ullrich, 764
Unger, 709
Urošević, 719
Vakili, 737
Varadarajan, 760
Viado, 747
Vladimirskaya, 750
Volcani, 759
Voronkevich, 726
Wagnon, 706
Waksman, 730
Walters, 753
Watson, 735
Weaver, 706
Weihing, 750
Wells, 752
Wenham, 751
Wenzl, 762
Wester, 718
Wilcoxson, 751
Williams, E. B., 708, 754
Williams, H. E., 706
Wilson, C. L., 719
Wilson, J. D., 749
Worley, 723
Yarwood, 733
Yoshii, 741, 743
Zadoks, 736
Zaumeyer, 722
Zeinalova, 732
Zeleny, 741
Zschau, 748

SUBJECT INDEX

Antibiotics, 730–1, 743
Bacteria, 727–8, 731
Diseases and disorders of:
  Apple, 754–5
  Banana, 758
  Cacao, 735
  Cereals, 735–42
  Citrus, 742–4
  Coconut, 760–1
  Coffee, 745–6
  Cotton, 746–7
  Fibre plants, 747
  Flowers and ornamentals, 748–51
  Fruit, 705–8, 720, 756–60
  Herbage crops, 732, 751–3
  Hops, 760
  Officinal plants, 708
  Palms, 761
  Pineapple, 708
  Potato, 708–11, 761–7
  Rice, 741–2
  Rubber, 711
  Sugar beet, 722
  Sugar-cane, 767–8
  Tea, 768
  Tomato, 731
  Trees and timber, 711–21
  Vegetables, 721–6
Fungicides, 720, 728, 750
General publications, 729, 732
Genetics, 707
Lists of fungi or diseases, 732
Radiation, 721
Reports from Canadian Forest Insect and Disease Survey, 717; Forest Products Research Board, London, 716; Forest Research, Great Britain, 711; Indian Coffee Board, 745; Society for Promoting the Cultivation of Brewing Barley and Hops in France, 738
Soils and fertilizers, 732
Systematic mycology, 705
Technique, 726, 731, 733, 742, 744
Virus diseases, 706–7, 709–10, 718, 722–3, 725–6, 733–6, 741–3, 746–51, 758, 761–4, 767